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ABSTRACT

Numerous studies indicate age and sex differences in adolescent interests and self-concept development; however, few longitudinal studies have been conducted outside the area of vocational interests. It was hypothesized that an examination of data from both cross-sectional and longitudinal samples would clarify age and sex differences in the development of adolescent self-concept. Male and female elementary, middle, and high school students completed questionnaires, a self-concept scale, interest assessments, and instruments about the sources of information used by adolescents. Results indicated that cognitive functioning was a primary determinant of self-concept. Environmental encounters such as peer/family relationships, school, role-taking, and reactions of others affected self-concept. The longitudinal data demonstrated consistency in self-concept measures over time. Cross-sectional comparison data, showing grade-level differences, did not replicate each other. Interest in interpersonal relationships, education, human ecology, and drugs was higher for older students than younger students. Social class and academic achievement had little effect on self-concept development. (Author/HLM)

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Final Report

Grant No. R01-HD 9094

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The Development of the Self-concept in Adolescence

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Introduction

Perhaps no single concept has dominated thinking and theorizing about adolescence as much as the prevalent view that adolescence is a time of dramatic changes in the self-concept. One need only peruse any undergraduate text or popular trade book written for parents or the public at large to find this view strongly expressed. And, there are researchers, cited below, that provide data, albeit limited in scope, to support this view. It is no wonder, then, that adolescence has historically been viewed as a state of transcient psychological disturbance to be "put up with" by adults, in general, and "lived through" by adolescents. Indeed, much of everyday adolescent behavior is attributed to "causes" indicative of transient disturbances. As has been suggested elsewhere (cf., Dusek, 1977), such views lead to the expectation of "socially deviant" behavior from those we call adolescents.

It is no surprise, then, that numerous investigations have been conducted to assess relationships between adolescents' self-concepts and other measures of adolescent development. For example, a number of studies, reviewed below, have related self-concept to scholastic achievement, often on the premise that improvements in self-concept should result in improvements in achievement. Similar comments may be made with regard to social class differences in self-concept.

Other research (reviewed below) has been focused on the explication of age (or grade) and sex differences in adolescent self-concept. This research, too, is based on the view that changes, perhaps dramatic, occur in the self-concept during adolescence. Although age (or grade) and sex differences in measures of self-concept are frequently reported, the large majority of such differences are from cross sectional studies. Results from longitudinal researches are much less clear in indicating such differences.

Similar comments may be made about the study of adolescent interests (cf., Dusek & Monge 1974; Dusek, Kermis, & Monge 1979). Numerous researches, reviewed below, indicate age and sex differences in adolescent interests. However, few longitudinal studies have been conducted, especially outside the confines of the vocational interest literature. Nonetheless, popular stereotypes about the nature of adolescent interests exist, e.g., that adolescents are preoccupied with interest in sexuality. Little, if any, concern has been demonstrated for showing the adolescent's relative interest in sexuality vs. other topics of interest, for example, or in studying the relationship of interests to individual difference variables, such as sex or social class. The data collected for this project should clarify all these relationships.

Objectives

There were several general objectives in the research reported below. By providing both cross sectional and longitudinal research it was hoped that age (grade) and sex differences in the development of adolescent self-concept could be clarified. Comparing the results from the three cross sectional samples with those from the longitudinal sample studied over three years should provide valuable evidence relevant to these issues. It was also possible to assess the relationship between self-concept and several individual difference variables, viz., social class and academic achievement. By providing both longitudinal and cross sectional comparisons light should be shed on these relationships.

A second general objective was to provide data on the development of adolescent interests. Grade and sex comparisons for the three cross sectional studies and the longitudinal study provide pertinant information about the development of adolescents' interests. Of major concern in this regard was the study of interests of more general sorts than those typically studied with vocational interest inventories.

There were, then, several specific objectives in the research. One was to test the notion that the self-concept is selective and directive in nature, i.e., that the self-concept has motivational properties (e.g., McCandless 1970, p. 444). This objective was met by determining the relationship between self-concept development and interests, both cross sectionally and longitudinally. A second specific objective was to provide longitudinal data regarding the development of the self-concept in adolescence, thus making it possible to examine and explicate age *changes* as well as age differences in the self-concept during this developmental period. Another objective was the same as the second but with regard to adolescent interests. These data are also relevant to understanding the so called "generation gap". Finally, the study was designed in such a way as to allow the assessment of the relationship between social class and self-concept and interests development during adolescence and the relationship of achievement to self-concept. Studying these individual difference variations was seen as a way to clarify existing literature and suggest future directions for research.

Literature Review

The literature review is divided into several sections for expository purposes. References may be found at the end of this report.

Review of Self-Concept Research

Perhaps more than any other developmental period adolescence has attracted research on the self-concept. Although there are undoubtedly a number of reasons for this, nearly every theorist has attributed a special importance for self-concept development to pubescence and the emergence of the reproductive capacity (Dusek, 1977; Erikson, 1968; Freud, 1969; Lewin, 1939; McCandless, 1970). As a result, a primary concern of investigations into self-concept development has been to examine discontinuities in adolescent self-concept due to the theoretical upheaval accompanying pubescence (e.g., Carlson, 1965; Constantinople, 1969; Engel, 1959; Erikson, 1968; Hamachek, 1976; Long, Ziller, & Henderson, 1968; Marcia, 1976, 1977; Monge, 1973; Simmons, Rosenberg & Rosenberg, 1973).

A second major thrust of research into adolescent self-concept development is the determination of the factors or components that comprise the self-concept (e.g., Monge, 1973; Rosenkrantz, Vogel, Bee, Broverman, & Broverman, 1968; Smith, 1962). The basic intent in much of this research is to determine the structure of self-concept in order to understand its complexities and the balance necessary among the several components for adequate adjustment (McCandless, 1970).

A third area in which only little research has been conducted has as its thrust general issues regarding differences in self-concept due to the measurement techniques employed (e.g., Crowne & Stephens, 1961; Katz & Zigler, 1967; Kokenes, 1974; Lowe, 1961; Winne, Marx, & Taylor, 1977), analysis techniques (e.g., Smith, 1962), or other methodological issues and assumptions involved in self-concept research (e.g., Crowne & Stephens, 1961; Rosenkrantz et al., 1968). The relevant issues involved in this area of research will be discussed within appropriate contexts of the following literature review.

Although the majority of studies of the self-concept are attempts to relate self-concept to various aspects of social or personal adjustment (e.g., Coopersmith, 1967; Crandall & Bellugi, 1954; Dittes, 1959; MacDonald, 1969; Montemayer & Eisen, 1977; Mussen & Porter, 1959; Ring, Lipinsky, & Bradinsky, 1965), there have been several investigations in which the primary concern was with age differences and age changes in self-concept. As these latter are most critical and relevant to the research reported herein they will be reviewed in some detail. In addition, ancillary research clarifying sex differences in self-concept will be reviewed as it is also directly pertinent.

There are few longitudinal studies focused on the explication of age-related changes in self-concept during the adolescent years. (Although Long, Ziller, and Henderson (1968) investigated the self-concept of boys and girls in grades six through twelve their analyses did not focus on age changes in self-concept). One was a two-year study conducted by Engel (1959), who used a Q-sort to assess self-concept. At the first testing the 172 students were in the eighth- and tenth-grades and at the second testing in the tenth- and twelfth-grades, respectively. For the general sample the correlation between the scores of the two Q-sorts was .78 (corrected for attenuation). In addition, adolescents with high positive self-concepts on the first testing were more stable than adolescents with negative self-concepts on the first testing. The stability of the self-concept did not vary with the age, IQ, or sex of the subjects. Engel's data, then, suggest that the self-concept is relatively stable irregardless of certain individual difference variables. However, the large time span between measurements and the post-pubescent age level of the subjects make it unlikely that significant changes in self-concept would be detected. Carlson (1965),noting these and other deficiencies in Engel's (1959) study, examined the stability of two aspects of adolescent self-concept, social vs. personal orientation and self-esteem, over a six year period. The subjects, 16 males and 33 females, completed a lengthy self-descriptive questionnaire in both the sixth- and twelfth-grades, indicating items "most" and "least" characteristic of the self. Although the details of the data analyses were scanty, the data apparently indicated no sex differences at the preadolescent level (grade 6 data) but did reveal that boys increased in personal orientation and girls in social orientation, as might be expected on the basis of sex-role development, over the six years of the study. That there were no sex differences in the level or stability of self-esteem over the six year period seems to indicate it is an aspect of self-concept different from that assessed by the personal-social orientation, which may be a reflection of sex role adjustment. Caution must be exercised in generalizing these data, however, for, as Carlson (1965) notes, the sample is small and biased in certain respects, e.g., volunteer subjects.

A third study, a combination longitudinal and cross-sectional study of self-concept stability, was conducted by Constantinople (1969), whose primary concern was an investigation of Erikson's (1959, 1963) psychosocial theory of development. The subjects were 952 college students who were studied yearly for a three-year period. Part of the study involved a six week test-retest of self-concept on 150 of the subjects. The Q-sort was used to assess self-concept. For the 150 retested subjects the stability correlations ranged from .45 on the identity diffusion scale to .81 on the intimacy scale. The median correlation for all scales was .70. Stability was somewhat higher for males than for females, and the males seemed to show greater positive increases in resolving identity confusion than the females, perhaps because of the career orientation of college programs during the time these data were collected. Although these data indicate a degree of stability they are not particularly impressive for several reasons. First, although the small time span between testings is very reasonabole for assessing the reliability of the instrument it is probably insufficient for assessing developmental change, which takes place as a result of interactions with the environment, broadly defined over a longer time period. Second, the subjects were not only a select and biased sample, which was quite suitable for Constantinople's primary purposes, but they were also all at the upper age range of adolescence, making it likely that little change in self-concept would be detected because many of the hypothetical reasons, for example, the onset of puberty, for self-concept disturbance were long past.

It should be pointed out that there are other longitudinal investigations of adolescent self-concept or identity development. Marcia (1975, 1976, 1977), for example, has reported a six-year follow up study of the identity status of a group of college students first tested in 1967 and 1968 (Marcia, 1976). Hauser (1976) has assessed longitudinally the self-images of late adolescent patient and non-patient samples. In these and other longitudinal researches very small or select samples, usually of older adolescents, have been tested with highly specialized instruments. This combination of factors considerably limits the utility and generalizability of the findings with respect to the important issue of developmental changes in adolescent self-concept.

There are several observations that can be drawn from the data presented above. One is that little has been done to study longitudinally the continuity or discontinuity of adolescent self-concept development. As a result of the paucity of longitudinal data theorizing about the course of adolescent self-concept development must rest largely on cross sectional data. However, as Schaie (1965) and subsequently others (e.g., Baltes, 1968; Baltes & Nesselroade, 1970) have pointed out, relying heavily on the results of cross sectional research for mapping developmental changes can lead to erroneous conclusions.

Another observation is that in two of the longitudinal studies described in detail above no age changes were observed (Engel, 1959; Constantinople, 1969). However, the age of subjects tested in the two studies was such that the students were already post-pubescent and, indeed, perhaps into late adolescence in one of the studies (Constantinople, 1969), thus making it unlikely that discontinuities due to the onset of pubescence or other factors would be detected. In the one study in which younger subjects were tested there was evidence of age-related change in self-concept as well as evidence of sex differences in self-concept development for differing components of the self-concept (Carlson, 1965). Carlson's data suggest there is value in studying the components of the self-concept as these might change as a function of age, sex, or other individual difference variables.

Several of the early studies of the structure of the self-concept were conducted by Smith (1960, 1962). Smith's (1962) primary concern was a comparison of various factor solutions to subject's (96 male hospital patients) self-ratings on 40 semantic differential scales, bipolar adjectives developed by Osgood, Suci, and Tannenbaum (1957). There were two findings relevant to the research reported below. First, the results of all three factoring methods indicated that the self-concept, as assessed by the semantic differential, was not unitary but rather was composed of a number of components. Second, one method, Kaiser's (1959) varimax method of rotation to simple structure, provided the most readily interpretable factor structure. The six factors identified were: Self-Confidence, Social Worth, Corpulence, Potency, Independence and Tension-Discomfort. These data suggest the value of studying developmental trends in adolescent self-concept as a function of its components. To the extent that age-related changes in self-concept are "factor specific", then global measures of self-concept, such as those used by Engel (1959), will likely not detect important developmental changes. To date there has been only one longitudinal study in which changes in the components of self-concept have been related to age (Carlson, 1965). However, there are a number of cross-sectional studies in which components of self-concept have been assessed for subjects of different ages or other individual difference variables. Several of those that are directly relevant and that are representative are reviewed below.

Katz and Zigler (1967) reported sex and age differences in self-concept for fifth-, eighth-, and eleventh-grade males and females (20 of each sex and grade level). Self-concept was assessed through two methods - the Coopersmith self-esteem inventory (Coopersmith, 1967) and a twenty adjective checklist composed of ten socially desirable and ten socially undesirable qualities. Moreover, the subjects completed the questionnaires under each of three sets of instructions: ideal self, social self, regular self-concept instructions. The sample was divided at each grade level into high and low IQ groups in order to investigate the relationship between intelligence and self-concept development. The discrepancies between self-ideal self and self-social self increased across grade levels with the former showing greater differences than the latter for males than females. In addition, at the fifth grade level boys saw themselves being evaluated more negatively than girls with the reverse holding for eighth grade and with no difference for the eleventh grade. The brighter (higher IQ) children and the older children showed greater self-ideal self discrepancies than the lower IQ and younger children. The older and brighter children also made fewer extreme responses than the younger and less bright children. To the extent that self, ideal self, and social self represent different components of the self-concept the data of Katz and Zigler (1967) demonstrate the value of investigating developmental differences in components of self-concept. In addition, their data clearly show relationships between IQ and self-concept not previously reported.

Bohan (1973) studied age and sex differences in self-concept in fourth-, sixth-, eighth-, and tenth-grade students with the Coopersmith self-esteem inventory. The tenth-grade girls showed a lower self-concept score but there were no other significant age or sex differences. Prawat (1976), who tested students in grades six, seven and eight with the short form of the Coopersmith self-esteem inventory, reported no significant grade or sex differences.

However, a number of researchers using larger samples that span a wider range of the adolescent years do report age and sex differences in adolescent self-concept.

Simmons et al. (1973) measured four dimensions of the self-image in 1,917 students in grades three through twelve. The four dimensions of self-image were: self-consciousness (the salience of the self to the individual), stability (the individual's surety of what he or she is like), self-esteem (the individual's global positive or negative attitude toward the self), and perceived self (the individual's perception of how others view him or her). The results indicated that the early adolescents (ages twelve to fourteen) had a higher level of self-consciousness, greater instability of self-image, lower global self-esteem, and a more negative perceived-self than the younger children. These differences showed a trend toward dissipating at the older adolescent levels. Nonetheless, even the older adolescents evidenced greater self-consciousness and instability of self-image than the eight- to eleven-year-old children. The older adolescents did have a more positive global self-esteem than either the young children or the early adolescents. This latter result replicates Engel's (1959) research reviewed above. Simmons et al. argue that these data indicate a general pattern of self-image disturbance in early adolescence, with a repair of this disturbance occurring in later adolescence. Further analysis led the authors to conclude that the transition into junior high school was a primary causal agent in the onset of this disturbance. Only at this interval, between ages eleven and twelve, was there a significant increase in disturbance on all four measures. Of course, pubertal changes are also occurring, along with cognitive changes, and no doubt these all interact and increase disturbance in the self-image.

In a very comprehensive study of developmental changes in components of self-concept Monge (1973) examined the connotative factor structure of the self-concept of 1035 males and 1027 females across grades six through twelve. The data were semantic differential responses to 21 of Smith's (1962) pairs of bipolar adjectives. Following Smith's recommendation the data were factor analyzed and rotated to Kaiser's (1959) varimax criterion. The analysis revealed four interpretable factors: I - Achievement/Leadership, II - Congeniality/Sociability, III - Adjustment, and IV - Sex Appropriateness of Self-Concept. In general, males had higher scores than females on factors I and III and females had higher scores than males on Factor II. In addition to these sex differences there were significant grade level differences for the first three factors and a significant Grade Level x Sex of Subject interaction for Factors I and IV. In general, males increased at a higher rate than females on Factor I but females decreased on Factor IV while males remained relatively constant. On Factor II both sexes generally showed an increase and on Factor IV a decrease with age. Monge's (1973) research, then, demonstrated clear age and sex differences in the development of components of the self-concept, contrary to the general findings of the longitudinal research reported above.

Unlike the general findings of the longitudinal studies the cross-sectional research does indicate age (e.g., Katz & Zigler, 1967; Monge, 1973), sex (Monge, 1973), intellectual level (Katz & Zigler, 1967), and social class (e.g., Soares & Soares, 1969) differences in the development of the self-concept in adolescents. As noted above, the age levels studied in the longitudinal research have tended to be in the post pubescent range. In the one longitudinal study in which younger adolescents were included (Carlson, 1965) different age trends were found. In addition, none of the longitudinal studies conducted to data have been designed in such a manner as to allow unambiguous interpretations of the findings with respect to age, cohort and time of measurement (e.g., Schaie, 1965, 1970). It is clear, then, that the area of self-concept development is in need of well-designed research using a sequential strategy (Schaie, 1965) in order to clarify self-concept development. In addition, no previous research has investigated the longitudinal aspects of self-concept development as a function of the components of self-concept or social class. One goal of the research reported below was to provide data pertinent to these issues.

Researchers in the area of self-concept have argued both that adequate self-concept is necessary for a normal and healthy personality and that the self-concept is a motivator in the sense of selective and directive functions of behavior. Research on this issue, particularly non-clinical research, is extremely scarce (e.g., see McCandless, 1967 for a review). A second objective of the research was to investigate the nature of this motivational function of the self-concept. In proposing this research it was decided that rather global (macro) measures would be more sensitive to the motivational aspects of self-concept than more specific (micro) measures. This decision was based on McCandless' (1970) suggestion that self-concept differences between individuals should relate to different vocational, recreational, and developmental interests in individuals. It was decided that measures of adolescents' interests, as suggested by McCandless, would suit the purposes well. Research on adolescent interests is reviewed next.

Review of Research on Adolescent Interests

The analysis of interests and their significance to individuals has been the object of study by educators and psychologists for a number of years. Most of the research in this area has involved the assessment of adult interests in the context of vocational choice and adjustment. For example, studies have been done using inventories such as the Strong Vocational Interest Blank (Strong, 1943). Studies of the interests of children and adolescents have been infrequent, and no cross-sectional studies comparing more than two age levels have come to the authors' attention. The importance of developmental information on interests for a complete understanding of child and adolescent development has been discussed by Powell (1971), among others. Such information would apparently be particularly interesting in reaching an understanding of adolescent life problems (e.g., Harris, 1959), adolescent cliques (e.g., Marks, 1957) and for understanding changes in adolescent interest patterns (e.g., Fox, 1947; Mallinson & Crumrine, 1952).

Early research on adolescent interests focused primarily on pragmatic issues of vocational choice and decision making (e.g., Strong, 1931, 1943; Thorndike, 1930), and was aimed primarily at validating vocational interest tests and developing interest schedules for use in vocational counseling. Nevertheless, some indication of the relative strength or intensity of various adolescent interests (the "hierarchy of interests") can be gleaned from the data. For example, Strong (1931) reported that, in general, interest in physical skill, daring, and strenuous activity decreased among men as they grew older; interest in solitary rather than group activities showed a concurrent increase. Unfortunately, Strong's research was conducted primarily with males and therefore tells us little about the interests of females.

Lehman and Witty (1927), using the Strong Vocational Interest Blank, noted that the greatest range of interests occurred in those aged 9 through 22 years; the variety of interests dropped yearly thereafter. They also presented data indicating that brighter individuals had a greater number of interests than individuals of average intelligence at each age level, and that boys had a somewhat greater number of interests than girls. These data suggest a shift from breadth of interests to depth of interests across the adolescent years.

A second specific area in which a considerable body of research has accumulated on interests is recreational pursuits. As Pressey and Kuhlen (1957) demonstrated, recreational interests change dramatically from age 6 to 21, with childish play activities becoming less frequent over age. By age 15 or 16 adolescents begin to show an increasing preference for heterosexual activities and activities requiring lower expenditures of physical energies. For example, social affairs and dating are preferred over participation in sports. These qualitative changes in recreational interests reflect broad sociocultural factors, such as exposure as a function of age and sex to different levels of recreational activities, but are also dependent upon physiological and intellectual development. As noted above, bright adolescents engage in a greater number and larger variety of recreational activities, and their interests tend to be more similar to those of individuals who are several years older than to those of individuals of the same chronological age.

Although these data partially describe the developmental course of interests and hint at some of the factors underlying this development, they are narrow in scope and leave many questions unanswered. For example, they tell us little about the relative salience of interests, or how a hierarchy of interests might change across the adolescent years. Information on these issues is necessary for explicating the interaction between interests and cognition in adolescence.

Cross-sectional studies of adolescent self-expressed or spontaneously generated interests give some indication of developmental trends in relative levels of interest in various topics. Symonds (1936a, 1936b) was among the first to study the relative ranking of topics of interest among male and female adolescents. The topics which he asked the subjects to rank were gleaned from the subject's own recommendations. Boys were most interested in recreation, health, money, and personal manners and were least interested in civic affairs, love and marriage, mental hygiene, and their daily schedule. Personal attractiveness, the first-ranked topic of interest for girls, was closely followed by recreation, manners, and health. Of least interest to girls were study habits, love and marriage, mental hygiene, and civic activities. Interest in safety, personal and moral qualities, home and family relationships, getting along with other people, and a basic philosophy of life were included in the middle range of interests. Symonds felt that the social and economic conditions of the society strongly influenced interests but he did not elaborate how these influences might operate.

Harris (1959) administered a reconstructed version of Symonds' Inventory to 1,165 adolescent males and females in 1957 and compared the results with Symonds'. This procedure allowed a time-lag assessment of changes in interests of adolescents from 1935 to 1957. Although Harris' study was conducted on a different sample and 22 years later than Symonds' research, the relative rankings of the 15 topics remained quite similar (boys' rankings on the two occasions correlated .76 while girls' rankings correlated .55). There was also a moderately high degree of similarity between the boys' and girls' rankings in both 1935 and 1957: in 1935 the rank order correlation between the rankings of the sexes was 0.80, and in 1957 it was 0.58.

Harris' research suggests the importance of studying sex differences in interests. The significant sex differences in the rankings at both times of measurement probably reflect differences in socialized sex-role values (Broverman, Vogel et al., 1972; Kohlberg & Zigler, 1967). The differences due to time of measurement probably reflect broad cultural changes. Unfortunately, Harris did not analyze his data for age differences, leaving us somewhat in the dark as to possible developmental trends in the nature of adolescent interests. Finally, it is important to note that the similarities in rankings for both the two times of measurement and between the sexes indicate some underlying factor(s) that might be responsible for the continuity over time in the way adolescents view matters that are of interest to them. Although the nature of these underlying factors cannot be gleaned from available data, it may be that continuities within a culture as well as commonalities of experience among adolescents in any generation (such as physical growth and development and changing cognitive capabilities) might lead to a continuity of interests across generations.

Amatora (1957, 1960a, 1960b) used a fruitful and certainly unique strategy to study adolescent interests. Rather than employing standardized instruments, she simply asked adolescent and pre-adolescent boys and girls to list three interests in order of their greatest importance. This approach allowed the subjects the greatest flexibility in stating interests and thereby eliminated the forced-choice of "uninteresting" topics. Seventh- and eighth-grade boys and girls reported interests falling into 8 categories: education, the good life, health, money, objects, relatives, travel, and vocation (Amatora, 1957). The fifth- and sixth-graders (Amatora, 1960a) listed the same 8 categories plus two others, school and parents. Although sex differences emerged in both studies these were not analyzed statistically. Moreover, neither within- nor between-study grade-level (age) differences were analyzed, thus leaving open the question of developmental differences in the interest patterns of adolescents. Examination of her data, however, suggests grade level differences and developmental changes in the rankings of interests.

Longitudinal studies would provide the optimal means of assessing developmental changes in the nature of interests. Unfortunately, with one exception (Freeberg & Rock, 1973) available longitudinal data are limited primarily to interests assessed by the Kuder Preference Record (Fox, 1947; Mallinson & Crumrine, 1952). Both Fox and Mallinson and Crumrine reported high test-retest correlations when using the Kuder Preference Record. But neither study was designed to examine specifically the factors that might relate to the interest choices of adolescents.

Freeberg and Rock (1973) administered a structured questionnaire assessing interest in social, academic, and recreational activities to 1,051 females and 1,019 males when they were in the seventh-, ninth-, and eleventh-grades. The factor analysis of the 124-item questionnaire revealed eleven factors. This was done separately for the males and females at each time of measurement thereby allowing the assessment of age and sex differences in factor patterns. Freeberg and Rock suggest that the significant sex differences that emerged reflect existing cultural standards for sex roles and that differential changes in interests as a function of sex may reflect differential maturation rates for females and males. Certainly it is clear from the work of Stone and Barker (1939) that maturation relates to interests; the interests of premenarcheal and postmenarcheal girls of the same chronological age differ. Hence, physical development, which occurs earlier for girls than for boys (Heald & Hung, 1973; Tanner, 1970), may be an important determinant of adolescent interests.

There was also a notable discontinuity in interests between the seventh- and ninth-grades for both the males and females. The factor patterns derived from the seventh- and eleventh-grade data were much more similar than either in comparison with the ninth-grade factor pattern. As Freeberg and Rock point out, this transition period is closely associated with not only the onset of puberty but also with new social experiences and changes in the social behaviors expected of an adolescent. The transition is particularly notable in activities related to academic efforts and leisure time pursuits. We might add that it is during this transition period that adolescents become facile with formal operational thinking (Inhelder & Piaget, 1958; Piaget, 1952; Piaget & Inhelder, 1969). These changes in cognitive ability may be one of the factors producing changes in interests because of new ways of viewing the social world (Flavell, 1977; Shantz, 1975).

The research reviewed above demonstrates age and sex differences in adolescent interests exist and that not only cultural but also physical growth and intellectual factors influence interests and changes in interests as development proceeds. If, indeed, this is the case, it is necessary that interests be studied over a much wider age range than has heretofore been done in order to insure the unconfounding of social transitions, such as occur when the child moves from middle or junior high school to the high school, and to be relatively certain of obtaining estimates of early interest patterns for comparison with patterns derived from later age points. In addition, since chronological age norms for the onset of important intellectual changes are at best rough indicators, it is necessary that interests be assessed for a broad age range of adolescents.

This was done in a recent project by Dusek, Kermis, and Monge (1979). An inventory of interests was constructed from the free responses of approximately 100 students each from grades five, seven, nine, eleven, and college. The students were asked to list those things about which they would like to have more information. It was stressed that these topics could be anything that was of interest to them. The responses were independently categorized by two raters into 31 categories that were further reduced to 14 topics. This list of topics was then used to assess the interests of approximately 50 students in each of the grades 5-12. First the students ranked the topics from 1-14 in terms of how important they were perceived to be to them; then they rated their degree of interest in each topic on a 7-point rating scale.

The analysis of the rankings revealed two major findings. First, as expected, the correlations among the salience hierarchies tended to be higher for adjacent than non-adjacent grade levels. Second, and unexpectedly, the data indicate the ninth grade as a transition point for the development of interests. The rankings of the ninth graders correlated significantly and highly with the rankings of subjects in grades 10-12, but the correlations involving the lower grade levels did not. A relatively high degree of stability in interests is reached by grade nine.

The principal components analysis of the interest ratings resulted in four components that were rotated to a varimax criterion: I - Interpersonal Relations, II - Human Ecology or Drugs, III - Education, and IV - Concern with the Future. The Grade Level x Sex analyses of variance for the component scores revealed a number of significant differences associated with Grade Level and Sex. The girls had a higher mean score than the boys on component I, with the reverse emerging for the remaining three components. In general, the significant grade level effects revealed grade 5 as a transition for Component I and grade 9 as a transition for Component III.

These findings replicate and extend the earlier research (reviewed above) and suggest the utility of the interest survey for studying adolescent social development.

As Dusek et al. (1979; Dusek & Monge, 1974) note, the data indicate that both broad sociocultural factors and cognitive/personality variables influence the development of, and change in, interests. The survey previously developed by the author seems appropriately sensitive to these influences.

The influences that determine adolescent interests and changes in them are similar to the influences that underlie adolescent self-concept (e.g., Brim, 1976; Piaget, 1972; Simmons et al., 1973; Symonds, 1936a, 1936b). Indeed, with respect to cognitive factors, Piaget (1972) has suggested the assessment of level of cognitive development within those areas in which the person has a high interest. And, many theorists (e.g., Brim, 1976; Dusek, 1977; Epstein, 1973; Montemeyer & Eisen, 1977) have discussed the relationship between cognition and self-concept. If self-concept has a "motivating" influence, and if the self-concept and interests are determined by the same or similar sets of factors, the two should be lawfully related.

In the present research this possibility was tested by having the subjects complete both a self-concept instrument and an interest inventory. The data were then analyzed to determine if any relationships existed between the measures. Since Monge's (1973) self-concept scale was used in conjunction with the author's (Dusek et al., 1979) scale to survey interests, it was possible to relate components of self-concept to components of interests. In this way we could also determine in combinations of components of self-concept related to specific combinations of components of interests. This advantage provides both for the assessment of the relation of personality types to interests and for some construct validity of the two measures being employed.

Self-Concept and School Achievement

Both the design of the study and the information made available to the investigators fortuitously allowed for studying the relationship between self-concept and school achievement and IQ, although this was not built into the research proposal. It is difficult to succinctly summarize the literature on the relation between self-concept and school achievement and intelligence because of the large number of instruments used and the general inconsistency of research findings. Purkey (1970) has summarized this literature and the interested reader is referred to his book for a more thorough treatment of the broad ranging issues than that presented here.

There are two major research questions that relate to the issue of self-concept and school achievement. First, and most simply, is the question of whether or not measures of self-concept and measures of school achievement are related. Relevant questions deal with the degree of relationship, sex differences and developmental trends in the relationship. The second important issue is much more difficult. It relates to the question of the direction of causation in relations between school achievement and self-concept. Some argue that self-concept is the primary cause of school achievement (cf., Calsyn & Kenny, 1977). These self-enhancement theorists believe that curricula in schools should initially enhance self-concept in order to allow greater school achievement. The antithesis of this view is espoused by the skill developmental theorists (cf., Calsyn & Kenny, 1977). These theorists believe that academic achievement exerts a significant influence on the development of the self-concept. From this perspective it is the task of the curriculum to promote learning and achievement which will then influence the self-concept and result in improvements in it. Since achievement test data were graciously offered the principal investigator it was deemed desirable to extend the breadth of the research to include the determination of relationships between self-concept and achievement test performance and IQ scores.

A number of studies have investigated the relationship of achievement measures to either global self-concept or some measure of a specific aspect of self-concept, usually academic self-concept. In some studies (e.g., Bledsoe, 1964; Piers & Harris, 1964; Trowbridge, 1974), developmental trends were assessed. In some studies (e.g., Anastasious, 1964; Milgram & Milgram, 1976) the sample was restricted to high IQ students. Although variety of measures tempers any generalizations, the following summary seems a fair representation of the data.

At the elementary school level global measures of self-concept correlate significantly and positively with measures of achievement. The correlations range in magnitude from about .17 (Piers & Harris, 1964) to .54 (Bruck & Bodwin, 1963), with most being on the order of .30. Findings with measures of academic self-concept are much less clear. Some (e.g., Jason & Dubnow, 1973) report correlations in the .2 - .3 range but others (e.g., Marx & Winne, 1974) report no relationship. Similar findings have been reported at the junior high school level. There is some evidence (e.g., Brookover, 1964) that for measures of academic self-concept the correlations may be somewhat higher than at the elementary school level. Brookover reported that for 1050 seventh graders the correlations between self-concept and various school grades ranged between .40 and .61, with similar results for both the boys and the girls. Finally, the few studies done at the high school level indicate little consistent relationship between global self-concept measures and school achievement (e.g., Bruck & Bodwin, 1963; Merrit, 1971; Edmunds, 1968). However, academic self-concept is consistently and moderately related to achievement (e.g., Binder, 1960; Brookover, Lepere, et al., 1965), the correlations ranging from the low .40s to the high .50s.

Since in the present research the same self-concept measure was employed for all subjects in grades five through twelve, and since achievement measures were available at each grade level, it was hoped that adding this component to the research would help to clarify the relationship between self-concept and achievement. The consistency of the measures employed and the longitudinal nature of the project will allow the assessment of trends not previously investigated.

Focus of Research

Because of the broad scope of the research project it seems appropriate to summarize the issues to which the research is directed. This is done below in a series of broadly phrased questions reflecting the major aspects of interest in the research.

1. Are there age differences in components of self-concept during adolescence?
2. What age changes occur in components of the adolescent's self-concept?
3. Are there age differences in adolescent's interests?
4. What age changes occur in adolescents' interests?
5. Is self-concept related to interests during the adolescent years?
6. To what degree do sex differences occur in the above assessments?
7. Are self-concept and measures of achievement related?

8. What is the nature of social class influences on self-concept and interests during the adolescent years?

The answers to these, and other questions related to them, will provide information necessary for gaining a more complete understanding of the adolescent's development.

Method

Subjects

The subjects were drawn from one elementary school, one middle school (grades 6-8), one ninth-grade school, and one high school (grades 10-12) of a suburban upstate New York school district. The school district serves largely middle- and lower-middle socioeconomic status families.

The initial 1975 sample of subjects consisted of 811 males and females in grades 5-12 who agreed to participate in the research. The 1976 sample consisted, in part, of those subjects who were tested in 1975, and who (a) were still enrolled in a participating school, (b) were present on the day of testing, and (c) agreed to participate. Of course, the initial twelfth graders were no longer included - no twelfth grader in 1975 who repeated the twelfth grade in 1976 was included. In addition, a new group of subjects who agreed to participate and who had not been tested previously were added to each grade level, including an entirely new sample of fifth graders. The sample for the third year of the study was constructed in a similar manner, including subjects who were tested in 1975 or 1976 or both years and a new sample of subjects in each grade level.

The number of males and females tested each year in each grade level are listed in Table 1 along with the mean ages of each grade level sample. A total of 174 male and 156 female subjects from the sample of 1975 subjects in grades 5-10 were tested each of the three years of the study. This sample of 330 subjects composes the longitudinal component of the research. Sample attrition at the lower grade levels was due largely to movement out of the school district. At the upper grade levels movement out of the district, dropping out of school, and refusal to continue participation all contributed to subject attrition.

Materials

The questionnaire consited of a cover sheet, then the self-concept scale, then the rankings and ratings form for assessing interests, and finally a series of sheets for obtaining data about the sources of information adolescents use. These latter data are extraneous to the major purposes of the proposal.

The items for the assessment of self-concept were those previously used by Monge (1973), allowing an attempt to replicate his findings. The bipolar adjectives may be found in Table 2. They were randomly ordered and placed on the endpoints of a line containing seven discrete sections, as shown for the pair Healthy-sick in Table 2.

The topics used to assess age changes and age differences in adolescent interests are listed in Table 3. These topics were taken from earlier research (Dusek & Monge, 1974; Dusek, Kermis & Monge, 1979) showing that they covered a wide range of adolescent interests. Using these topics allowed a replication of this earlier research.

Procedure

The questionnaire took approximately one class period (43 minutes) to complete.

Table 1

Sample Characteristics

Year	Grade Level								
	5	6	7	8	9	10	11	12	Total
1975									
Number of males	66	53	47	54	54	56	53	43	426
Number of females	56	53	38	55	47	51	53	32	385
Mean age (yrs.)	11.1	12.1	13.2	14.2	15.2	16.3	17.2	18.2	
1976									
Number of males	54	75	63	63	73	40	28	23	419
Number of females	45	64	64	51	67	42	25	16	374
Mean age (yrs.)	10.7	11.8	13.0	13.4	14.9	16.0	17.0	18.0	
1977									
Number of males	69	76	99	84	94	70	47	46	585
Number of females	42	57	90	93	80	85	48	44	539
Mean age (yrs.)	10.7	11.7	12.8	13.8	14.3	15.3	16.6	18.1	

Table 2

Bipolar Adjectives Used to Assess Self-Concept[a]

Smart-dumb
Success-failure
Leader-*follower*
Sharp-dull
Superior-*inferior*
Valuable-*worthless*
Confident-unsure
Kind-cruel
Friendly-unfriendly
Nice-awful

Good-*bad*
Happy-sad
Relaxed-*nervous*
Steady-*shaky*
Refreshed-*tired*
Satisfied-*dissatisfied*
Stable-unstable
Rugged-*delicate*
Hard-soft
Strong-weak

Healthy ___:___:___:___:___:___:___ *sick*

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a. Italicized pole was left-most on instrument.

Table 3

Format used to Assess Rankings and Ratings of Interests

		Not at all interesting			Medium interest		Very highly interesting	
_____	Philosophy and religion	1	2	3	4	5	6	7
_____	Medicine and health	1	2	3	4	5	6	7
_____	Science and math	1	2	3	4	5	6	7
_____	Love and marriage	1	2	3	4	5	6	7
_____	Future work	1	2	3	4	5	6	7
_____	Arts, crafts and sports	1	2	3	4	5	6	7
_____	Teachers and school	1	2	3	4	5	6	7
_____	Birth control	1	2	3	4	5	6	7
_____	Understanding other people	1	2	3	4	5	6	7
_____	Venereal (social) disease	1	2	3	4	5	6	7
_____	Sexual relations and reproduction	1	2	3	4	5	6	7
_____	Drugs	1	2	3	4	5	6	7
_____	Dating and going steady	1	2	3	4	5	6	7
_____	Ecology	1	2	3	4	5	6	7

The fifth graders were always tested in intact classrooms. The sixth- through twelfth-graders were tested in large groups.

Subjects were instructed to put their name on the cover sheet, along with their birth date, grade and sex. Next the subjects were instructed to complete the self-concept questionnaire by reading each of the bipolar adjective pairs and putting a check on the line to indicate their "characteristic self" for each adjective pair. Next the subjects were instructed to read each of the topics and rank them from 1 to 14 in terms of importance in the space to the left of each topic and rate them in terms of interest by circling a number to the right of each topic.

Analyses

The self-concept and interest rating data collected each year were analyzed by component analyses, the components being subjected to varimax rotation. Factor scores were calculated and analyzed in a series of 8(Grades) x 2(Sex) analyses of variance. Similar procedures were used to analyze the data for the longitudinal sample. In this case, factor scores were subjected to 6(Groups) x 2(Sex) analyses of variance, where Group 1 was composed of those subjects initially tested as fifth graders in 1975 and for whom complete data were available from the 1976 (Grade 6) and 1977 (Grade 7) testings. Similarly, Groups 2-6 were composed of subjects initially in Grades 6-10, respectively, in 1975 and for whom complete data were available from each subsequent testing.

The factor analytic and canonical correlation approaches were both used to assess the relationship between self-concept and interests. Separate analyses were done for each cross-sectional sample. For the longitudinal sample analyses were done to measure both within-year and across-year relationships.

Social class differences in self-concept and interests were measured through factor analytic techniques. Separate component analyses were done on the data from lower- and middle-class students. Social class ratings were made on the basis of paternal occupational level ratings based on U.S. Bureau of the Census (1960) classifications. Briefly, these levels may be characterized as follows: 0 = long-term unemployed, 1 = laborers, 2 = service workers, except private household, 3 = private household workers, 4 = operatives and kindred workers (e.g., apprentices), 5 = craftsmen, foremen, and kindred workers, 6 = sales workers, 7 = clerical and kindred workers, 8 = managers, officials, propriators, and farmers and farm managers, and 9 = professional, technical, and kindred workers. In order to maintain a sufficiently large sample for the factor analyses occupational groupings of 0-5 were considered to represent the lower class and 6-9 to represent the middle class.

Achievement test and IQ scores were available for a large percentage of the subjects. For the fifth- through eighth-graders these scores came from the IOWA Achievement Tests and Cognitive Abilities Tests. For the ninth- through twelfth-grades the scores were from the Stanford Achievement Tests and the Otis-Lennin. Correlations between factor achievement, IQ and factor scores were computed. In addition, in an attempt to replicate the findings of earlier research, analyses of variance were computed on factor scores for groups selected on level (e.g., high vs. low) of achievement test performance.

Results

The results will be presented in several sections. First, results of the analyses of the self-concept data will be discussed separately for each year and then for changes across years. Second, the results of analyses of the interest rankings and ratings will be presented separately for each year and for changes across years. The next section will be a discussion of the relations between the self-concept and interest data. The final section will present data on social class effects on self-concept and on the relationship between self-concept and academic achievement test performance.

Analyses of Self-Concept Data

The responses to the 21 items of the self-concept scale were scored with a "7" for the space closest to the positive or high end of the scale and a "1" for the space closest to the negative or low end of the scale. (See Table 4 for the determination of positive and negative poles of the scales.) Using this scoring procedure facilitated interpretation and the comparison of these data with that of others (e.g., Monge 1973; Smith 1962) who used similar scales and procedures.

The data for each year's sample were submitted to a principal components analysis of a Scale x Scale (21 x 21) intercorrelation matrix with unities in the main diagonal. Only components with eigenvalues greater than or equal to one were extracted. These components were then rotated to Kaiser's (1959) varimax criterion in order to facilitate interpretation (Smith 1962). Coefficients of congruence (Harmon 1967) were computed to determine factor similarity. Analyses of variance were carried out on factor scores to assess age and sex differences.

1975 Data. The data for the 426 males and 385 females were first analyzed separately. For both males and females four factors emerged. Coefficients of congruence for like-factors ranged from .80 to .94, indicating a degree of factor structure similarity sufficiently high to combine the data from the two sexes and conduct an overall analysis (see Monge 1973).

The components derived from the analysis of the data from the entire (N = 811) 1975 sample are listed in Table 4. Coefficients of congruence for like-factors were computed between the factor patterns for the individual sexes and the total sample. These ranged from $|.96|$ to $|.99|$ for the male-to-total-sample comparisons and $|.94|$ to $|.98|$ for the female-to-total-sample comparisons. These data support the appropriateness of combining the sexes for purposes of an overall analysis.

Factor I was defined primarily by the positive adjectives relaxed, steady, stable, refreshed, healthy, happy, and satisfied. Monge (1973) labeled this factor Adjustment. The positive adjectives indicate the individual has achieved a balance with the environment. The negative adjectives indicate a lack of homeostatic balance and convey a sense of helpless frustration.

Factor II, which Monge labeled Achievement/Leadership, was defined primarily by the adjectives smart, sharp, valuable, success, superior, and confident. The positive adjectives denote a sense of one's self as being capable and intelligent. The negative adjectives convey a sense of the self as being not very intelligent and as being a "loser".

Factor III, defined primarily by the adjectives nice, kind, friendly and good, is

Table 4[1].

Varimax Factors from Analysis of 1975 Data

Variable[a]	Factor Loadings[b]				
	I	II	III	IV	
Relaxed-nervous	.75				
Steady-shaky	.67				
Stable-unstable	.63				
Refreshed-tired	.58				
Healthy-sick	.56				
Happy-sad	.49		.44		
Satisfied-dissatisfied	.48	.36			
Smart-dumb		.72			
Sharp-dull		.65	.31		
Valuable-worthless		.65			
Success-failure		.60			
Superior-inferior		.58		.33	
Confident-unsure	.40	.46			
Nice-awful			.79		
Kind-cruel			.78		
Friendly-unfriendly			.73		
Good-bad		.32	.58		
Rugged-delicate				.78	
Hard-soft				.72	
Strong-weak		.32		.47	
Leader-follower				.43	
% of Variance	14.6	14.2	13.2	8.9	50.9

a. Positive pole listed at left to facilitate interpretation.
b. Loadings less than .30 in magnitude omitted.

appropriately labeled Congeniality/Sociability (Monge, 1973). The positive adjectives connote someone who enjoys and perhaps actively initiates social stimulation. The negative adjectives portray the self as unsociable and perhaps even antisocial.

Factor IV was defined by the adjectives rugged, hard, strong and leader. Monge (1973) labeled this factor Masculinity-Femininity and Smith (1962) labeled it Potency. The adjectives at the extremes define part of the classical descriptions of male and female sex roles (e.g., Broverman, Vogel, Broverman, Clarkson, & Rosenkrantz 1972).

Factor scores were computed for each subject on each factor. Each of these scores was then analyzed in an 8(Grades) x 2(Sexes) analyses of variance in order to assess grade and sex differences for each of the four factors (see Table 5). The mean score of the males was significantly higher than the female's mean score for Adjustment ($M = .16$ for males and $M = -.16$ for females), Achievement/Leadership ($M = .18$ for males and $M = -.22$ for females), and Sex Role ($M = .33$ for males and $M = -.39$ for females).

The mean scores for each grade for each factor are listed in Table 6. The significant grade effects for Factors II (Achievement/Leadership) and IV (Sex Role) were followed up by Newman-Keuls tests (Winer 1962). For the Achievement/Leadership factor the mean score for Grade 8 was significantly ($p < .05$) higher than the mean score for Grades 11 and 12, with no other pairs differing significantly. For the Sex Role factor the mean score for Grade 5 was significantly ($p < .01$) higher than the mean scores for Grades 10, 11 and 12, with no other significant comparisons.

The means for the significant Sex x Grade interaction in the analysis of the scores from the Adjustment factor are listed in Table 7. Tests of simple effects revealed significant sex differences in the mean scores for Grades 6, 7, 8 ($p < .01$) and 10 ($p < .05$). The Grade Level effect was significant only for the female's data ($F\ (7,795) = 2.69$, $p < .05$). Newman-Keuls analyses revealed that the twelfth graders had a significantly higher mean score than the sixth graders ($p < .01$) and the subjects in grades 7, 8, 9, 10, and 11 ($p < .05$).

The sex difference that was present in the analysis of the Sex Role factor scores is, in part, an artifact of the scoring scheme (Monge 1973). As Monge has noted, the end points of the dimensions defining this factor are similar to those defining the traditional male and female sex roles in our culture. To the degree that views of the self become more sex-typed with age sex differences on the factor scores are to be expected because the male traits receive a higher score than the female traits in the scoring scheme used. One way to remove this artifact of the scoring system is to multiply the girls factor scores by -1, thereby creating for both the males and females a factor score indicating Sex Appropriateness of the Self-Concept (Monge 1973). This was done and the factor scores were again analyzed in a 8(Grades) x 2(Sex) analysis of variance.

The only significant effect was for the Grade x Sex interaction ($F\ (7,795) = 3.99$, $p < .001$). The graph of this interaction is shown in Figure 1. Tests of simple effects revealed significant sex differences for grades 5 ($p < .01$), 10 ($p < .01$) and 11 ($p < .05$). The grade level effect was significant only for the girls ($p < .01$). Newman-Keuls tests revealed that the mean score of the fifth graders was significantly different from that of the tenth- ($p < .01$), eleventh- ($p < .05$), and twelfth-graders ($p < .01$). The mean score of the twelfth graders was significantly different from the mean scores of the sixth- and seventh-graders ($p < .05$) and the mean score of the ninth graders ($p < .01$).

Table 5

Summary of Analyses of Variance for 1975 Factor Scores

Factor	Mean Squares			
	Sex	Grade	Sex x Grade	Error
I (Adjustment)	20.48***	1.92	2.69**	.97
II (Achievement/Leadership)	31.31***	2.03*	1.06	.94
III (Congeniality/Sociability)	.17	1.57	1.21	1.00
IV (Sex Role)	103.62***	3.24***	1.40	.85

Note: The degrees of freedom were 1 for Sex and 7 for Grade; error degrees of freedom were 795.

* $p < .05$
** $p < .01$
*** $p < .001$

Table 6

Mean 1975 Factor Scores for Each Grade Level

Factor	Grade							
	5	6	7	8	9	10	11	12
I	.12	-.03	.04	.03	-.16	-.09	-.14	.26
II	.04	.09	.03	.23	-.07	-.09	-.20	-.18
III	-.01	-.26	-.04	-.01	.03	.10	.07	.16
IV	.23	.10	.07	-.01	.08	-.24	-.21	-.25

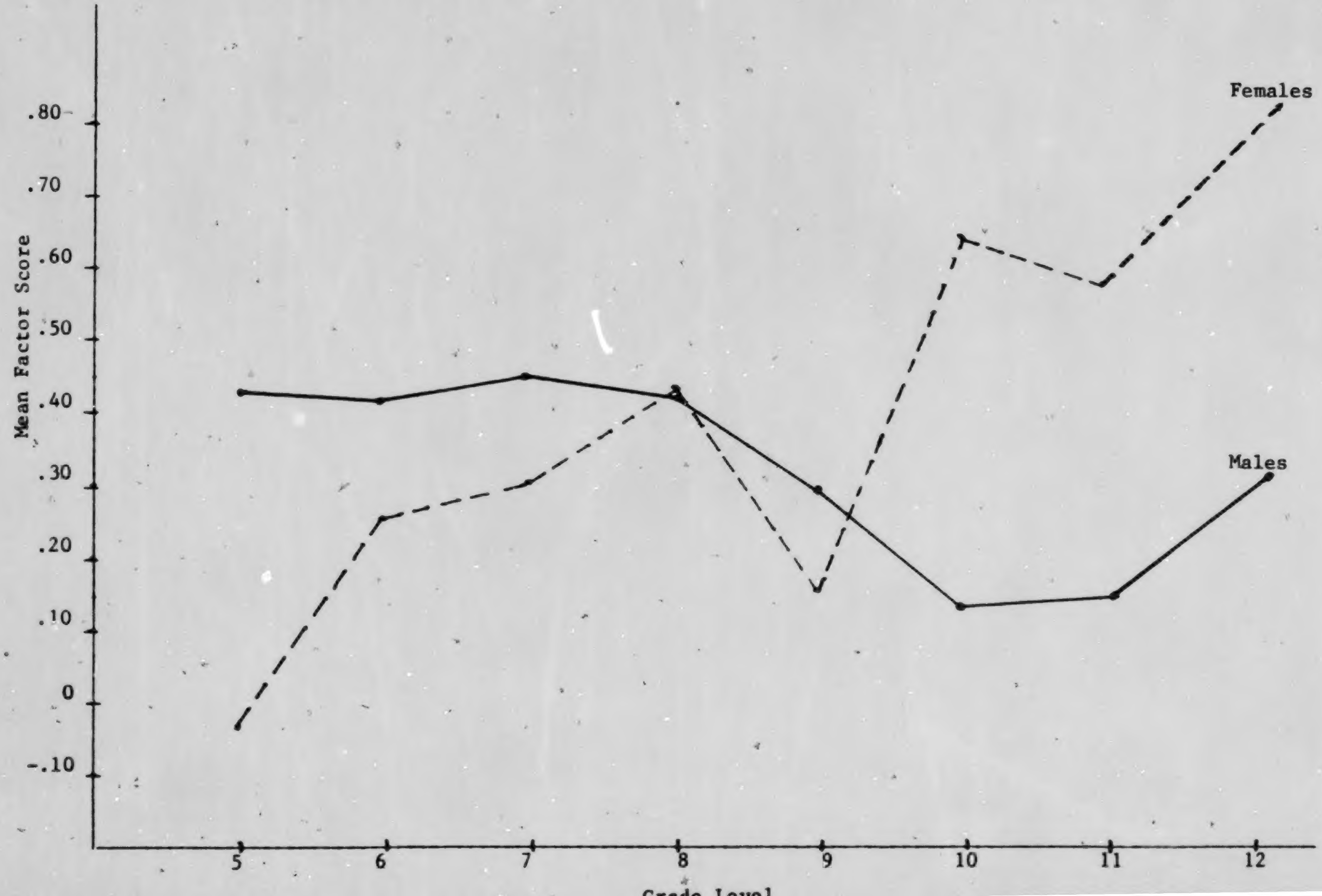
Table 7

Mean 1975 Factor Scores by Grade and Sex for the Adjustment Factor

	Grade							
Sex	5	6	7	8	9	10	11	12
Males	.13	.33	.37	.34	.03	.12	.12	.18
Females	.11	-.39	-.29	-.28	-.30	-.30	-.16	.33

Figure 1

Mean Factor Scores for Males and Females on Sex Appropriateness of the Self-Concept for 1975 Data



1976 Data. The separate component analyses of the data from the 419 males and 374 females each resulted in four components. Coefficients of congruence for like-factors ranged from |.78| to |.92|. These coefficients are sufficiently high to indicate the data from the two sexes may be combined for purposes of doing an overall component analysis.

The varimax factors from the overall component analysis may be seen in Table 8. The coefficients of congruence for like-factors were computed for the factor patterns of the individual sexes and the total sample. These ranged from |.93| to |.99| for the males-to-total-sample comparisons and from |.91| to |.98| for the females-to-total-sample comparisons.

The coefficients of congruence computed on the factor loadings for the 1975 (total sample) and 1976 (total sample) data ranged from |.93| to |.97| for like-factors, indicating a very high degree of similarity in the factor structures. Hence, the labels placed on the factors derived from the 1975 sample are retained for the appropriate factors derived from the 1976 sample.

In order to assess the possibility that the retested subjects performed differently than the subjects tested for the first time in 1976, separate component analyses were conducted on the data for retested and new subjects. The four factors that emerged from each of these analyses were the same as those reported for the 1975 sample. And, the factor structures were highly similar in the two analyses. The coefficients of congruence for like-factors ranged from |.94| to |.99|.

To further assess any differences that might exist in the data due to retesting of some subjects, another set of analyses was done. First, the 1976 data for all children in grades 6-12 was subjected to a component analysis. Children in grade 5 were omitted because all of them were tested for the first time in 1976 and therefore no retest group was available for comparison purposes. Second, factor scores were computed for all subjects. These scores were each analyzed in a 7(Groups) x 2(Sex) x 2(Retested/New subjects) analysis of variance.

The component analysis revealed four factors, the same in content as noted above for the total sample of subjects tested in 1976. The effects of interest in each of the analyses of variance for the four factor scores are those that involve differences between retested and new subjects. Of the 16 effects involving this factor only one was significant. For the Adjustment factor retested subjects had a significantly (F (1,666) = 4.30, $p < .05$) higher mean factor score (.03) than the subjects tested for the first time (M = -.14). These analyses suggest that the retested and new subjects responded to the test in a similar fashion. Hence, no distinction between these groups is made in the further analyses of the 1976 data.

To assess sex and grade level differences in the 1976 data, factor scores were computed for each of the four factors. These were then each analyzed in a 2(Sex) x 8(Grade) analysis of variance. These analyses are summarized in Table 9.

Significant Sex effects were present for the Achievement/Leadership, Congeniality/Sociability, and Sex Role factors. The mean score of the males was higher on the factors labeled Congeniality/Sociability (Ms = .23 and -.30 for males and females, respectively) and Sex Role (Ms = .32 and -.38 for males and females, respectively). The females had a significantly higher mean score (.11) on the Achievement/Leadership factor than did the males (M = -.09).

The means for the significant Grade Level effects for the Adjustment and Sex Role

Table 8

Varimax Factors from Analysis of 1976 Data

Variable[a]	Factor Loadings[b]				
	I	II	III	IV	
Success-failure	.74				
Smart-dumb	.68				
Superior-inferior	.68				
Valuable-worthless	.65				
Sharp-dull	.51				
Confident-unsure	.50				
Leader-follower	.46				
Relaxed-nervous		.66			
Happy-sad		.63	.32		
Refreshed-tired	.30	.63			
Steady-shaky	.35	.60			
Healthy-sick		.59	.30		
Satisfied-dissatisfied	.33	.56			
Stable-unstable	.34	.43			
Nice-awful			.79		
Kind-cruel			.75		
Friendly-unfriendly			.68		
Good-bad			.65		
Rugged-delicate				.75	
Hard-soft				.74	
Strong-weak				.61	
% of Variance	16.1	14.0	13.1	9.2	50.9

a. Positive pole listed at left to facilitate interpretation.
b. Loadings less than .30 in magnitude omitted.

Table 9

Summary of Analyses of Variance for 1976 Factor Scores

Factor	Mean Squares			
	Sex	Grade	Sex x Grade	Error
I (Congeniality/Sociability)	45.72***	.71	2.81**	.94
II (Achievement/Leadership)	6.60**	1.71	1.51	.94
III (Adjustment)	2.45	3.30**	.13	1.09
IV (Sex Role)	78.35***	4.36**	1.69*	.81

Note: The degrees of freedom were 1 for sex and 7 for Grade; error degrees of freedom were 777.

* $p < .05$
** $p < .01$
*** $p < .001$

Table 10

Mean Factor Scores for 1976

Factor	Grade							
	5	6	7	8	9	10	11	12
Adjustment	.32	-.06	.08	.09	-.09	-.03	-.28	-.29
Sex Role	.49	-.11	-.24	.02	.02	-.18	-.06	-.21

factors are listed in Table 10. Newman-Keuls analyses revealed that for the Adjustment factor the mean score of the fifth graders differed significantly ($p < .01$) from that of the eleventh and twelfth graders. There were no other significant effects. For the Sex Role factor the mean score of the fifth graders differed significantly from the mean scores of subjects in grades 6, 7, 9, 10, and 12 at the $p < .01$ level, and from the mean scores of subjects in grades 8 and 11 at the $p < .05$ level. The mean score of the tenth graders was significantly different ($p < .01$) from the mean score of the eighth graders and from the mean score of the ninth-, eleventh-, and twelfth-graders ($p < .05$).

The Grade Level x Sex interaction was significant for the Congeniality/Sociability and Sex Role factors. The mean scores are presented in Table 11. Significant sex differences on the Congeniality/Sociability factor occurred for grades five, six, eight and ten ($p < .01$), and for grade nine ($p < .05$). The simple effect of Grade Level was not significant for either the males or females. For the Sex Role factor significant sex differences at the $p < .01$ level for grades 5, 6, 7, 8, 9, 11, and 12. The Grade effect was significant for both the males (F (7,777) = 7.88 $p < .01$) and the females (F (7,777) = 4.93, $p < .01$). Newman-Keuls tests revealed that for the males the mean score of the fifth graders was significantly ($p < .01$) different from the mean scores of the sixth-, seventh-, and tenth-graders. For the females the mean score of the fifth-graders was significantly ($p < .01$) different from the mean scores of the seventh-, eleventh-, and twelfth-graders. There were no other significant effects.

As was done for the data composing the Sex Role factor in 1975, the girls' scores on the Sex Role factor for 1976 were multiplied by -1 and the 2(Sex) x 8(Grades) analysis of variance was recalculated. The only significant effect was the Sex x Grade interaction (F (7,777) = 6.39, $p < .001$). The mean scores are the same in value as those listed in Table 11, with the female's means reversed in sign. Tests of simple effects revealed significant ($p < .001$) sex differences at grades 5 and 7. The simple effect of Grade was significant for both the males ($p < .001$) and females ($p < .001$), with the differences between grade level means within each sex as noted above.

1977 Data. The data for the 589 males and 539 females were first analyzed separately. For both the males and the females four factors emerged. Unlike the case for the 1975 and 1976 data, the pattern of coefficients of congruence indicated a degree of factor dissimilarity. The coefficient of congruence was $|.94|$ for the Congeniality/Sociability factor and $|.88|$ for the Adjustment factor. Items composing the Achievement/Leadership and Sex Role factors were grouped differently in the two analyses, resulting in a coefficient of congruence of only $|.76|$ for the Achievement/Leadership factor. The coefficient of congruence between the male's Achievement/Leadership factor and the female's Sex Role factor was $|.55|$; the coefficient of congruence between the female's Achievement/Leadership factor and the male's Sex Role factor was $|.87|$. This resulted in a coefficient of congruence for the two Sex Role factors of only $|.16|$.

In order to further investigate these similarities and differences in the factor structures underlying the male's and female's data, coefficients of congruence were computed between the 1975 and 1977 data and 1976 and 1977 data separately for each sex. For the males the coefficients of congruence for like-factors ranged $|.86|$ to $|.95|$ for the 1975 and 1977 comparisons and $|.84|$ to $|.95|$ for the 1976 and 1977 comparisons. For the females the coefficients of congruence for like-factors ranged from $|.79|$ to $|.98|$ for the 1975 and 1977 comparisons and $|.85|$ to $|.96|$ for the 1976 and 1977 comparisons. These data indicate an acceptably high level of stability in factor structure for the two sexes across the three years of the study. As a result, it seemed both reasonable and, in order to compare the data for 1977 to that of the previous years, important, to combine the data from the 1977 males and females and do an overall analysis.

Table 11

Mean 1976 Factor Scores for Significant Grade Level x Sex Interactions

Factor		Grade							
		5	6	7	8	9	10	11	12
Congeniality/Sociability	M	.26	.13	.07	.32	.14	.25	.28	.42
	F	-.33	-.28	.12	-.28	-.16	-.42	-.20	-.84
Sex Role	M	.82	.08	.05	.42	.43	-.04	.42	.36
	F	.15	-.29	-.59	-.37	-.38	-.31	-.53	-.78

Prior to conducting the overall analysis it was desirable to determine if the data for the subjects who were retested differed from the data of the new subjects. The data for the subjects in grades 6-12 were subjected to a component analysis with a varimax rotation. The factor scores computed for the four factors that emerged were each subjected to a 8(Grades) x 2(Sexes) x 2(Retested/New) analysis of variance. Of the 16 effects involving comparisons between the retested and new subjects only one was statistically significant. On the Congeniality/Sociability factor the mean score (.085) of the retested subjects was significantly (F (1,989) = 5.50, $p < .05$) higher than the mean score (-.096) of the new subjects. As a result, it was decided to combine the data from the retested and new subjects in all further analyses.

The factors emerging from the analysis of the data from the total sample are listed in Table 12. Inspection of Table 12 reveals that the factors are similar to those from the analyses of the 1975 and 1976 data. To examine these similarities further coefficients of congruence were computed between the 1975 and 1977 data and the 1976 and 1977 data. The coefficients ranged from $|.96|$ to $|.99|$ for the 1975-1977 comparisons and $|.95|$ to $|.98|$ for the 1976-1977 comparisons. Substantially the same factors emerged in the 1977 analysis as in the analyses from the previous years.

Factor scores were computed for the 1977 data and were analyzed in a series of 8(Grades) x 2(Sex) analyses of variance. The analyses are summarized in Table 13. The males had significantly higher mean scores than the females on three of the factors: Achievement/Leadership (Ms = .13 and -.14 for the males and females, respectively), Congeniality/Sociability (Ms = .18 and -.20 for the males and females, respectively), and Sex Role (Ms = .31 and -.34 for the males and females, respectively). The mean scores of the males (-.04) and the females (.04) were not significanly different on the Adjustment factor.

The means for each grade level for each factor are listed in Table 14. On the Achievement/Leadership factor Newman-Keuls tests revealed that the mean score of the fifth graders was significantly ($p < .01$) lower than the mean scores of the subjects in grades 6, 8, 10, 11 and 12. On the Adjustment factor the sixth graders had a significantly lower mean score than subjects in grades 7 and 9 ($p < .05$) and 10, 11 and 12 ($p < .01$). The mean score of the tenth graders was significantly ($p < .05$) higher than the mean scores of the fifth- and eighth-graders. Newman-Keuls analyses indicated that for the Congeniality/Sociability factor the mean score of the eleventh graders was significantly ($p < .05$) different from the mean scores of the sixth-, tenth-, and twelfth-graders. For the Sex Role factor the sixth graders had a significantly higher mean score than the seventh graders ($p < .05$) and the ninth-, tenth-, and eleventh-graders ($p < .01$).

The means for the significant Sex x Grade interaction in the analyses of the scores from the Congeniality/Sociability factor are listed in Table 15. Tests of simple effects revealed significant sex differences for grades 5 ($p < .05$), 6 ($p < .01$), 7 ($p < .05$), 8 ($p < .05$), and 9 ($p < .001$). The simple effect of Grade was not significant for either sex.

The reanalysis of the factor scores associated with the Sex Role factor, i.e., after multiplying the female's scores by -1, revealed only a significant Sex x Grade interaction (F (7,1112) = 3.59, $p < .01$) (see Figure 2). Tests of simple effects revealed a significant ($p < .01$) sex difference at grade 6. The simple effect of grade was significant for each sex ($p < .01$). For the boys, the mean score of the sixth graders differed from that of the ninth- ($p < .05$), tenth- ($p < .01$), eleventh- ($p < .05$) and twelfth-graders ($p < .05$). For the female's no significant grade-level comparisons reached the $p < .05$ level of significance.

Table 12

Varimax Factors from Analysis of 1977 Data

Variable[a]	Factor Loadings[b]				
	I	II	III	IV	
Smart-dumb	.71				
Success-failure	.65	.32			
Valuable-worthless	.64				
Sharp-dull	.63				
Superior-inferior	.59				
Confident-unsure	.51	.39			
Good-bad	.45		.41		
Relaxed-nervous		.76			
Steady-shaky		.66			
Healthy-sick		.58			
Stable-unstable	.30	.58			
Refreshed-tired	.35	.58			
Happy-sad	.32	.54			
Satisfied-dissatisfied	.46	.50			
Nice-awful			.82		
Kind-cruel			.81		
Friendly-unfriendly			.78		
Rugged-delicate				.76	
Hard-soft				.67	
Strong-weak	.38			.54	
Leader-follower	.36			.45	
% of Variance	16.6	14.9	11.7	9.5	52.7

a. Positive pole listed at left to facilitate interpretation.
b. Loadings less than .30 in magnitude omitted.

Table 13

Summary of Analyses of Variance for 1977 Factor Scores

Factor		Mean Squares		
	Sex	Grade	Sex x Grade	Error
I (Achievement/Leadership)	23.29***	3.76**	.92	1.08
II (Adjustment)	1.32	5.16***	.78	1.01
III (Congeniality/Sociability)	42.37***	2.18*	1.85*	.90
IV (Sex Role)	118.87***	3.17***	1.08	.81

Note: The degrees of freedom were 1 for Sex and 7 for Grade; error degrees of freedom were 1112.

* $p < .05$
** $p < .01$
*** $p < .001$

Table 14

Mean Factor Scores for Each Grade

Factor				Grade				
	5	6	7	8	9	10	11	12
I (Achievement/Leadership)	-.33	.14	-.05	.09	-.13	.12	.07	.10
II (Adjustment)	-.09	-.31	.01	-.18	.04	.28	.16	.15
III (Congeniality/Sociability)	-.07	.14	.04	.03	-.12	.10	-.26	.07
IV (Sex Role)	.07	.31	-.04	.13	-.12	-.16	-.15	.06

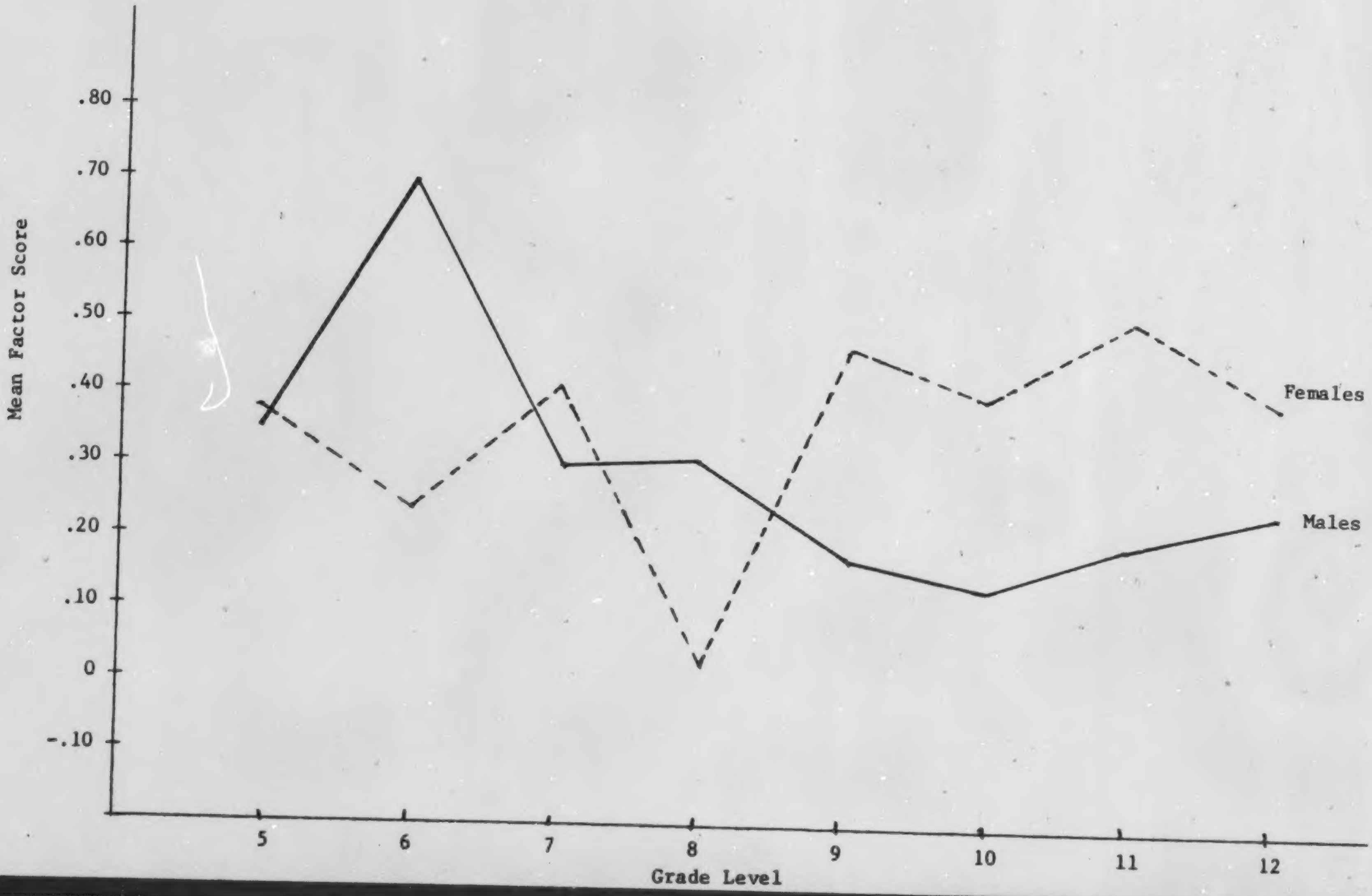
Table 15

Mean Factor Scores for the Sex x Grade Interaction for the Congeniality/Sociability Factor in the 1977 Data

Sex				Grade				
	5	6	7	8	9	10	11	12
Male	.17	.49	.20	.27	.06	.20	-.22	.13
Female	-.46	-.33	-.13	-.19	-.34	.01	-.29	.00

Figure 2

Mean Factor Scores for Males and Females on Sex Appropriateness of the Self-Concept for 1977 Data



Change in Self-Concept. A major purpose of the research was to assess changes in adolesescent self-concept. The data on change in self-concept come from the 330 subjects who were tested each of the three years of the study and who had complete data. The data from each of the three years for these 330 subjects (990 data sets) were entered into a component analysis. Factor scores were computed and were subjected to a 6(Groups) x 2(Sex) x 3(Years) analysis of variance, with repeated measures on the last factor.

The results of the varimax rotation of the component analysis are presented in Table 16. Four factors were present. The first is Adjustment, the second Achievement/Leadership, the third Congeniality/Sociability, and the fourth Sex Role. This factor structure is consistent with that repeatedly reported above for the analysis of the data from the individual years.

The analyses of variance of the factor scores are summarized in Table 17. The effects of major interest are those from the within-subjects portion of the analyses because they are associated with differences over time. Of the 16 effects involving the repeated measures factor only one was statistically significant, the Sex x Years interaction in the analysis of the Achievement/Leadership factor. The means for this effect are listed in Table 18. Although the males had higher mean scores than the females each year, only during 1975 was the difference statistically significant ($p < .001$). None of the Years main effects or Group x Years interactions (all $F < 1$) was significant. These data indicate virtually no change in these aspects of self-concept over the three testing periods. This lack of change is shown in Table 19, in which the mean scores for each factor for each group for each year are listed. As may be seen, the range of these mean scores is very small, being only slightly more than half the standard deviation (1.00) of factor scores.

Analysis of Interests Data

Two types of data were collected to assess adolescent's interests in a series of 14 topics previously (Dusek et al. 1979) shown to encompass a broad range of adolescent's interests. One type of data was a rank ordering of 14 topics in terms of how important they were perceived to be. The second was a rating of the degree of interest in each topic. This was done on a 7-point scale from "not at all interesting" to "very highly interesting". The two types of data provide somewhat different information about adolescents' interests (Dusek et al. 1979). Whereas ranking data force the subject to differentiate between the topics, ratings data allow the subject to indicate similarities in interests among topics. In addition, the ratings data may be subjected to multivariate analytic procedures which would not be appropriate to use with ranked data. The rankings data, then, provide a means of assessing the hierarchy of adolescent's interests. The ratings data allow the assessment of groupings and dimensions of interests, for example, through factor analytic techniques.

The mean rankings of each topic are presented in Tables 20, 21, and 22, and mean ratings for each topic in Tables 23, 24, and 25, for each grade level for each year of the study. Table 26 presents the correlations between the rankings and the ratings for each topic for each year of the study. Three of the correlations were between .20 and .30, six were between .31 and .40, 19 were in the range of .41 to .50, and 14 were between .51 and .60. Generally speaking, then, the correlations indicate the more important a topic is perceived the greater the greater the degree of interest in it. However, the correlations also indicate that the two measures are not so highly correlated as to preclude separate analyses of each.

Analysis of rankings data. Examination of Tables 20, 21 and 22 reveals that the salience hierarchies of topics differ across the grade levels. To investigate these

Table 16
Varimax Factors from Analysis of Self-Concept Data for Subjects Tested Each Year

Variable[a]	Factor Loadings[b]				
	I	II	III	IV	
Relaxed-nervous	.70				
Healthy-sick	.65				
Steady-shaky	.64				
Refreshed-tired	.60	.30			
Satisfied-dissatisfied	.59				
Happy-sad	.56		.34		
Stable-unstable	.56	.37			
Superior-inferior		.68			
Smart-dumb		.66			
Sharp-dull		.66			
Success-failure	.37	.62			
Valuable-worthless	.31	.61			
Confident-unsure	.43	.47			
Leader-follower		.43		.32	
Nice-awful			.77		
Kind-cruel			.77		
Friendly-unfriendly			.75		
Good-bad		.40	.46		
Rugged-delicate				.81	
Hard-soft				.75	
Strong-weak		.37		.49	
% of Variance	15.8	15.7	11.5	8.8	51.8

[a] Positive pole listed at left to facilitate interpretation.

[b] Loadings less than .30 in magnitude omitted.

Table 17

Summary of Analyses of Variance of Factor Scores
for Subjects Tested Each Year

Effect	Mean Square for Factor I	II	III	IV
Group	3.09	1.45	.87	.96
Sex	.43	7.78*	23.30***	57.16***
Group x Sex	1.16	4.78*	.64	.80
Error between Ss	1.91	1.86	1.59	1.59
Years	.30	.71	.06	.68
Group x Years	.24	.49	.60	.19
Sex x Years	.32	1.97*	.09	.60
Group x Sex x Years	.33	.67	1.04	.51
Error within Ss	.55	.54	.64	.54

Note: The degrees of freedom were 5 for Groups, 1 for Sex, 2 for Years, 318 for error between Ss, and 636 for error within Ss. Factor I is Adjustment, factor II is Achievement/Leadership, factor III is Congeniality/Sociability, and factor IV is Sex Role.

* $p < .05$
** $p < .01$
*** $p < .001$

Table 18

Mean Achievement/Leadership Factor Scores
for the Sex x Years Interaction

Sex	Years 1975	1976	1977
Male	.199	-.028	.128
Female	-.245	-.101	-.025

Table 19

Mean Factor Scores for Retested Subjects for Each Year

Factor	Group		Year	
		1975	1976	1977
I	1	.10	.07	-.02
	2	-.23	-.25	-.12
	3	.11	-.16	-.04
	4	.04	.00	.21
	5	.31	.35	.30
	6	.14	.08	.17
II	1	.08	-.20	-.14
	2	-.01	-.17	.17
	3	.20	.27	.16
	4	-.16	-.08	.01
	5	-.11	-.24	.00
	6	-.15	.02	.11
III	1	-.03	-.14	.01
	2	-.14	.01	.04
	3	-.23	-.03	-.06
	4	.27	.01	.04
	5	.01	-.06	-.26
	6	-.02	.01	.24
IV	1	.18	-.09	.00
	2	.04	-.05	.14
	3	-.04	-.02	-.09
	4	-.06	-.06	-.03
	5	-.14	-.33	-.12
	6	-.07	-.21	-.18

Table 20

Mean Ranking of Each Topic for Each Grade for 1975 Data

Topic	Grade							
	5	6	7	8	9	10	11	12
Philosophy and religion	7.8	7.8	8.5	8.4	8.6	10.2	8.3	8.0
Medicine and health	5.3	5.4	5.4	5.6	6.6	7.2	6.1	6.5
Science and math	6.1	5.9	7.1	8.9	7.3	8.6	8.0	8.2
Love and marriage	8.5	8.7	8.0	5.5	6.6	6.6	5.6	5.4
Future work	5.6	5.5	5.4	4.4	3.8	3.4	2.8	3.1
Arts, crafts and sports	3.1	4.4	5.5	6.6	4.4	4.6	5.2	6.1
Teachers and school	7.6	6.4	7.4	8.3	8.3	8.7	7.0	7.5
Birth control	9.0	9.2	8.5	9.7	10.1	10.2	9.0	10.2
Understanding other people	6.0	4.9	5.1	5.2	4.4	4.3	3.3	3.3
Venereal disease	8.5	9.5	8.4	9.7	10.5	10.2	10.1	11.5
Sexual relations and reproduction	9.1	7.2	7.8	6.1	8.4	8.0	7.7	8.1
Drugs	11.0	11.6	10.6	11.3	10.3	9.9	9.9	11.9
Dating and going steady	7.9	7.6	7.7	6.9	5.1	5.8	5.6	5.8
Ecology	6.1	6.9	7.0	7.6	7.7	7.5	6.9	8.1

Table 21

Mean Ranking of Each Topic for Each Grade for 1976 Data

Topic	Grade 5	6	7	8	9	10	11	12
Philosophy and religion	7.9	8.9	8.7	9.4	9.0	9.6	10.7	8.9
Medicine and health	6.6	6.0	6.3	6.2	6.2	6.5	5.6	6.0
Science and math	6.9	6.6	8.0	8.4	7.7	8.3	8.1	7.9
Love and marriage	8.3	7.2	6.6	6.0	6.0	6.2	5.5	5.8
Future work	4.9	4.9	4.2	4.3	2.7	3.6	3.5	2.9
Arts, crafts and sports	3.4	4.2	5.5	5.1	4.6	5.4	5.6	5.1
Teachers and school	9.3	8.1	8.8	8.2	7.9	8.2	8.7	8.3
Birth control	8.7	9.6	9.6	10.3	9.4	9.6	9.4	9.7
Understanding other people	6.6	5.9	5.3	5.4	4.4	3.5	4.1	3.6
Venereal disease	8.7	9.0	9.3	9.8	9.6	10.5	10.5	11.1
Sexual relations and reproduction	7.5	7.2	6.7	6.8	6.8	7.4	5.9	7.5
Drugs	12.4	11.7	12.0	10.9	10.8	11.1	9.8	9.5
Dating and going steady	5.9	5.9	5.4	4.8	5.2	5.9	5.9	5.7
Ecology	7.6	8.3	8.4	8.3	7.9	7.8	8.1	7.4

Table 22

Mean Ranking of Each Topic for Each Grade for 1977 Data

Topic	Grade							
	5	6	7	8	9	10	11	12
Philosophy and religion	7.9	8.7	8.5	8.8	9.0	10.5	8.8	10.3
Medicine and health	5.8	6.2	6.3	6.9	5.9	6.9	6.4	6.2
Science and math	6.3	7.4	7.5	7.1	7.8	8.2	8.7	9.3
Love and marriage	8.7	6.6	6.5	5.4	6.0	6.0	6.6	5.3
Future work	4.5	4.9	4.3	4.0	2.8	2.9	3.2	3.0
Arts, crafts and sports	4.1	4.5	4.5	5.3	6.1	5.0	6.1	6.3
Teachers and school	8.1	9.5	7.7	7.8	7.5	8.1	8.1	10.1
Birth control	9.2	8.7	9.5	9.4	10.0	10.5	9.9	8.8
Understanding other people	6.8	6.6	5.8	5.3	4.5	4.9	3.9	3.9
Venereal disease	8.9	8.7	9.6	9.6	10.2	11.2	12.2	10.5
Sexual relations and reproduction	8.6	7.1	7.6	6.6	7.0	7.1	7.3	7.1
Drugs	11.6	11.6	11.6	10.8	11.2	10.8	10.9	10.1
Dating and going steady	7.1	5.4	5.0	4.5	6.2	4.8	5.9	6.5
Ecology	7.5	8.0	7.6	8.7	8.2	8.8	7.9	7.6

Table 23
Mean Rating of Each Topic for Each Grade for 1975 Data

Topic	Grade 5	6	7	8	9	10	11	12
Philosophy and religion	3.18	3.57	3.19	3.35	3.09	2.80	3.38	3.70
Medicine and health	4.54	4.63	4.52	4.59	4.20	4.25	4.49	4.68
Science and math	4.25	4.76	4.19	3.72	3.84	3.86	3.63	4.23
Love and marriage	3,74	4.00	4.61	5.30	4.56	4.83	5.06	5.59
Future work	5.14	5.58	5.65	5.92	5.97	5.85	6.31	6.30
Arts, crafts and sports	6.48	5.71	5.80	5.46	5.42	5.77	5.70	5.68
Teachers and school	3.92	4.06	3.54	3.80	3.48	3.44	3.72	4.27
Birth control	2.68	3.26	3.56	3.24	3.20	3.18	3.34	3.70
Understanding other people	4.89	5.32	5.31	5.25	5.32	5.64	6.12	6.15
Venereal disease	3.37	3.64	4.02	3.26	3.02	3.16	2.98	3.18
Sexual relations and reproduction	2.90	4.40	4.65	5.19	3.97	4.43	4.73	4.72
Drugs	1.71	2.13	3.02	2.83	2.85	3.52	2.96	2.85
Dating and going steady	4.05	4.27	4.94	5.21	4.97	5.18	5.13	5.39
Ecology	4.87	4.90	4.66	4.50	4.12	4.69	4.90	4.77

Table 24

Mean Rating for Each Topic for Each Grade for 1976 Data

Topic	Grade							
	5	6	7	8	9	10	11	12
Philosophy and religion	3.50	3.19	3.32	3.16	3.15	3.24	2.55	3.36
Medicine and health	4.41	4.49	4.50	4.54	4.43	4.43	4.57	4.67
Science and math	3.84	4.37	3.86	4.25	3.86	3.89	3.79	3.82
Love and marriage	4.33	4.40	5.25	5.29	4.88	4.83	4.96	5.05
Future work	5.17	5.55	5.98	5.82	6.01	5.96	5.96	6.23
Arts, crafts and sports	6.09	5.71	5.66	5.53	5.46	5.67	5.34	5.72
Teachers and school	2.92	3.68	3.46	3.82	3.75	3.79	3.24	3.90
Birth control	3.54	3.24	3.59	3.11	3.23	3.23	3.13	3.33
Understanding other people	4.32	4.75	5.31	4.96	5.23	5.54	5.24	5.92
Venereal disease	3.44	3.94	3.93	3.32	3.11	3.32	3.17	2.97
Sexual relations and reproduction	4.50	4.66	5.15	4.85	4.69	4.70	4.91	4.23
Drugs	1.90	2.11	2.56	2.90	2.29	2.73	3.19	4.23
Dating and going steady	4.86	4.99	5.53	5.52	5.19	5.21	4.96	5.31
Ecology	4.10	4.21	4.37	3.89	4.04	4.39	4.06	4.33

Table 25
Mean Rating of Each Topic for Each Grade for 1977 Data

Topic	Grade 5	6	7	8	9	10	11	12
Philosophy and religion	3.44	3.02	3.24	3.10	3.20	2.87	3.65	3.00
Medicine and health	4.79	4.67	4.33	4.29	4.49	4.21	4.78	4.74
Science and math	4.51	3.90	3.82	4.23	3.97	3.71	4.07	3.83
Love and marriage	3.91	4.88	4.59	5.50	5.13	5.15	5.01	5.04
Future work	5.29	5.68	5.50	5.93	6.27	6.14	6.34	6.24
Arts, crafts and sports	5.89	5.90	5.51	5.72	5.43	5.49	5.40	5.43
Teachers and school	3.80	2.80	3.36	3.31	3.68	3.62	3.75	3.31
Birth control	3.46	3.39	3.44	3.12	2.95	3.23	3.78	3.80
Understanding other people	4.78	4.64	4.79	5.18	5.41	5.26	5.78	5.56
Venereal disease	4.08	3.65	3.73	3.20	3.27	3.16	3.00	3.12
Sexual relations and reproduction	4.53	4.86	4.46	5.19	4.75	4.63	4.76	4.60
Drugs	2.46	2.02	2.24	2.31	2.81	3.09	3.00	3.49
Dating and going steady	4.51	5.17	5.15	5.85	5.07	5.31	5.17	4.80
Ecology	4.43	3.78	4.22	4.02	4.15	3.74	4.46	4.40

Table 26

Correlations Between the Rankings and the Ratings for all Subjects Tested Each Year

Topic	1975	Year 1976	1977
Philosophy and religion	-.58	-.58	-.57
Medicine and health	-.49	-.46	-.44
Science and math	-.46	-.52	-.53
Love and marriage	-.52	-.57	-.56
Future work	-.32	-.35	-.31
Arts, crafts and sports	-.50	-.49	-.42
Teachers and school	-.48	-.51	-.53
Birth control	-.32	-.30	-.29
Understanding other people	-.42	-.46	-.48
Venereal disease	-.32	-.28	-.28
Sexual relations and reproduction	-.50	-.48	-.53
Drugs	-.48	-.57	-.49
Dating and going steady	-.48	-.52	-.52
Ecology	-.42	-.45	-.46
N =	811	793	1124

differences a series of correlations were computed between the salience hierarchies for the grade levels within each year and between the sexes within each grade level in each year. These correlations are presented in Table 27. Examination of Table 27 indicates a generally high degree of correspondence in the salience hierarchies of the sexes, half the correlations being .90 or greater. The salience hierarchies for the sexes, then, are highly similar within each grade and for each year.

The correlations among the salience hierarchies of topics for the grade levels reveal a different pattern. In general, the correlations are higher for adjacent than separated grade levels. And, the correlations were generally higher adjacent to the main diagonal, the correlations decreasing to the right. These data indicate greater similarities in the salience hierarchies of interests for adjacent than non-adjacent grade levels and suggest that the subjects in the upper grade levels view the topics differently than the subjects in the lower grade levels. To further investigate these grade level differences it was decided to examine these differences with the interest ratings data.

Analysis of ratings data. The mean ratings for each grade level for each year of the study are listed in Tables 23, 24 and 25. The correlations of the ratings for the sexes within each grade level for each year and between the grade levels for each year are presented in Table 28. As with the rankings data, the correlations for the sexes were very high, none being below .82. The correlations across the grade levels also follow a pattern similar to that for the rankings, viz., higher correlations near the main diagonal, with the correlations decreasing in magnitude toward the upper right of the matrix. It was decided to investigate these differences further following a factor analysis of the ratings conducted in order to reduce the number of variables to be analyzed.

The ratings data for each year were subjected to a principal components analysis and varimax rotation. Factor scores were computed and were subjected to 8(Grades) x 2(Sex) analyses of variance in order to investigate grade and sex differences.

1975 Data. The analysis of the 1975 data resulted in four factors (see Table 29) accounting for fifty three percent of the variance. The first factor was defined by the interests love and marriage, dating and going steady, sexual relations and reproduction, future work, and understanding other people. This appears to be an Interpersonal Relations factor, with future work indicating a future orientation and understanding other people indicative of a concern for other's feelings. The second factor was defined by medicine and health, teachers and school, and philosophy and religion. This factor may appropriately be labeled Education. Factor three, defined by the topics venereal disease, birth control, and drugs, appears to be a Human Ecology or Drugs factor. The fourth factor was defined by arts, crafts and sports, ecology, and science and math. This factor, on which future work had a secondary loading, appears to reflect an interest in the future (ecology and recreation) and the role of technology (science and math) in that, and is perhaps best labeled Concern with the Future.

Factor scores were computed for each factor and each was subjected to an 8(Grades) x 2(Sex) analysis of variance. These analyses are summarized in Table 30. The Grade effect was significant for Factor I. The means for each grade level are presented in Table 31. Newman-Keuls tests revealed that the mean score for grade 5 was significantly ($p < .01$) lower than the mean score at each other grade level; the mean score for the sixth graders was significantly lower than that of the seventh- and ninth-graders ($p < .05$) and eighth-, tenth-, eleventh-, and twelfth-graders ($p < .01$); the seventh- and ninth-graders scored significantly lower than the eighth- ($p < .05$), eleventh- ($p < .05$), and twelfth-graders ($p < .01$).

Table 27

Correlations Among the Interest Hierarchies Across Grades and Between Sexes (on the Main Diagonal) for Interest Rankings

1975

	Grade							
	5	6	7	8	9	10	11	12
5	.81	.90	.89	.57	.74	.66	.64	.62
6		.83	.94	.71	.78	.70	.74	.75
7			.70	.79	.82	.79	.82	.80
8				.90	.83	.84	.89	.92
9					.88	.96	.95	.94
10						.90	.96	.90
11							.89	.98
12								.89

1976

	5	6	7	8	9	10	11	12
5	.90	.94	.87	.80	.83	.76	.67	.71
6		.93	.95	.92	.93	.88	.83	.83
7			.84	.97	.97	.94	.90	.89
8				.89	.98	.95	.94	.92
9					.91	.98	.94	.96
10						.87	.95	.98
11							.91	.95
12								.84

1977

	5	6	7	8	9	10	11	12
5	.92	.86	.87	.73	.77	.72	.71	.60
6		.87	.94	.90	.84	.86	.79	.79
7			.87	.95	.92	.93	.90	.80
8				.92	.94	.97	.90	.84
9					.91	.96	.96	.90
10						.93	.94	.90
11							.91	.92
12								.90

Note: For $r \geq .46$, $p < .05$
For $r \geq .61$, $p < .01$

Table 28

Correlations Among the Interest Ratings Across Grade and Between Sexes (on the Main Diagonal)

1975

Grade

	5	6	7	8	9	10	11	12
5	.90	.93	.83	.69	.79	.74	.74	.75
6		.88	.89	.80	.84	.78	.83	.84
7			.88	.92	.94	.94	.92	.90
8				.91	.93	.92	.96	.96
9					.88	.96	.97	.97
10						.88	196	.92
11							.88	.98
12								.86

1976

	5	6	7	8	9	10	11	12
5	.84	.94	.91	.86	.89	.88	.81	.68
6		.86	.94	.91	.94	.93	.86	.71
7			.91	.95	.97	.96	.94	.80
8				.92	.97	.96	.95	.86
9					.95	.99	.95	.86
10						.83	.96	.90
11							.91	.91
12								.87

1977

	5	6	7	8	9	10	11	12
5	.82	.89	.90	.80	.82	.75	.78	.74
6		.94	.97	.95	.91	.90	.88	.86
7			.90	.95	.93	.91	.91	.87
8				.97	.96	.95	.92	.88
9					.95	.98	.97	.94
10						.93	.95	.95
11							.85	.96
12								.88

Note: For $\underline{r} \geq .46$, $\underline{p} < .05$
For $\underline{r} \geq .61$, $\underline{p} < .01$

Table 29

Varimax Factors from Analysis of Interest Ratings for 1975 Data

Variable	Factor Loadings[a]				
	I	II	III	IV	
Love and marriage	.83				
Dating and going steady	.83				
Sexual relations and reproduction	.68				
Future work	.42			.38	
Understanding other people	.40				
Medicine and health		.69			
Teachers and school		.66		.33	
Philosophy and religion		.60			
Venereal disease			.71		
Birth control			.68		
Drugs			.67		
Arts, crafts and sports				.79	
Ecology			.38	.60	
Science and math		.44		.47	
% of variance	16.5	12.9	12.9	10.7	53.0

[a] Loadings less than .30 omitted for clarity.

Table 30

Summary of Analyses of Variance for 1975 Interest Factor Scores

Factor		Mean Squares			
		Sex	Grade	Sex x Grade	Error
I.	(Interpersonal Relations)	3.33	15.24***	.58	.88
II.	(Education)	18.91***	4.59***	1.52	.94
III.	(Human Ecology or Drugs)	3.28	3.29**	1.08	.98
IV.	(Concern with the Future)	25.50***	3.60***	.95	.95

Note: The degrees of freedom were 7 for grade, 1 for sex, and 795 for error.

* $p < .05$
** $p < .01$
*** $p < .001$

Table 31

Mean Interest Factor Scores for 1975 Data

Factor		Grade							
		5	6	7	8	9	10	11	12
I	(Interpersonal Relations)	-.67	-.30	-.02	.34	-.02	.12	.33	.47
II	(Education)	.03	.28	-.09	.04	-.14	-.36	-.01	.30
III	(Human Ecology or Drugs)	.29	-.02	-.32	.03	.11	-.16	-.03	-.01
IV	(Concern with the Future)	.30	.04	-.04	-.29	-.22	.07	.04	.03

On Factor II the females ($\bar{x} = .16$) had a higher mean score than the males ($\bar{x} = -.15$). The grade level effect was also significant, with the tenth graders having a significantly lower mean score than the fifth-, eighth-, and eleventh-graders ($p < .05$) and the sixth- and twelfth-graders ($p < .01$). The seventh- and ninth-graders had significantly ($p < .05$) lower mean scores than the eleventh- and twelfth-graders.

The grade level effect was statistically significant in the analysis of Factor III. The seventh graders had a lower mean score than the fifth- ($p < .01$) and ninth-graders ($p < .01$) and the tenth graders had a lower ($p < .05$) mean score than the twelfth graders.

On Factor IV the males had a higher mean score ($\bar{x} = .17$) than the females ($\bar{x} = -.19$). The significant grade level effect was due to the lower mean scores of the eighth- and ninth-graders ($p < .01$) than the fifth-graders.

1976 Data. Prior to conducting an analysis of the data from the complete 1976 sample, the data from the sixth- through twelfth-graders was factor analyzed and the factor scores were subjected to 2(Sex) x 7(Grade) x 2(New/Retested) analyses of variance in order to assess retesting effects. Three factors emerged from the varimax analysis. Of the 12 effects involving comparisons between the new and retested subjects two were statistically significant. On Factor II (Human Relations) the newly tested subjects had a significantly ($F\ (1/666) = 4.88$, $p < .05$) higher mean score (.10) than the retested subjects ($M = -.06$). The analysis of the factor scores for Factor III (Concern with the Future) resulted in a significant Grade Level x Retested/New interaction ($F\ (6,666) = 3.18$, $p < .01$). Significant differences between new and retested subjects appeared for grades seven and ten. At the seventh grade level the new subjects had a higher mean score (.48) than the retested subjects ($M = -.18$). At the tenth grade level the retested subjects had a higher mean score (.17) than the new subjects ($M = -.35$). Since these two effects seemed to represent no consistent pattern it was decided to combine the data for the retested and all the newly tested subjects for an overall analysis.

The component analysis of the data for the entire 1976 sample resulted in three factors (see Table 32)[2]. The coefficients of congruence indicate that Factor II is the Interpersonal Relations factor that appeared in the 1975 data (coefficient of congruence equals .99), Factor III was the Human Ecology or Drugs factor from the 1975 data (coefficient of congruence is .81), and the first factor is a combination of the Education and Concern with the Future factors from the 1975 data (coefficients of congruence were .76 between this factor and Factors II and III from the 1975 data).

The analyses of variance of the factor scores are summarized in Table 33. The females had a significantly higher mean score (.14) than the males ($\bar{x} = -.12$) on Factor I and the males had a significantly higher mean score (.12) than the females ($\bar{x} = -.13$) on Factor II. These sex differences may reflect traditional sex role socialization, especially since the Interpersonal Relations factor has a heavy weighting on items indicative of sexual interest (Dusek & Monge 1974; Dusek et al. 1979).

The significant Grade effect in the analysis of the factor scores (see Table 34) from Factor II was due to the significantly ($p < .05$) lower mean score of the seventh- than the fifth- and sixth-graders. The fifth graders had a significantly ($p < .05$) higher mean score than the eighth graders.

1977 Data. Prior to analyzing the data from the entire 1977 sample, the data from

Table 32

Varimax Factors from Analysis of Interest Ratings for 1976

Variable		Factor Loadings[a]		
	I	II	III	
Medicine and health	.71			
Venereal disease	.71			
Birth control	.64			
Understanding other people	.53	.37		
Ecology	.53			
Philosophy and religion	.48			
Love and marriage		.86		
Dating and going steady		.82		
Sexual relations and reproduction		.78		
Arts, crafts and sports			.62	
Science and math	.35		.53	
Teachers and school	.39		.50	
Drugs			-.45	
Future work		.33	.43	
% of variance	18.9	16.9	10.7	46.5

[a] Factor loadings less than .30 omitted for clarity.

Table 33

Summary of Analyses of Variance for 1976 Interest Factor Scores

Factor	Mean Square			
	Sex	Grade	Sex x Grade	Error
I. (Education/Concern with Future)	14.00***	1.19	.75	.98
II. (Interpersonal Relations)	11.42***	3.75***	.83	.96
III. (Human Ecology or Drugs)	.44	1.07	.58	1.01

Note: The degrees of freedom were 7 for grade, 1 for sex, and 777 for error.

* $p < .05$
* $p < .01$
*** $p < .001$

Table 34

Mean Grade Level Factor Scores for Factor II of 1976 Interest Ratings

Grade							
5	6	7	8	9	10	11	12
.29	.22	-.24	-.16	-.02	-.03	-.04	-.07

the children in grades 6-12 were subjected to a principal compenents analysis with varimax rotation. The four factors that resulted were similar to those that emerged from the analysis of the 1975 data. Factor scores were calculated for each factor and were analyzed in a 7(Grades) x 2(sex) x 2(New/retested) analysis of variance in order to assess effects due to retesting. Of the 16 effects involving the retesting factor only one was statistically significant. For the factor defined by the topics Arts, crafts and sports, Future work, and Ecology, the main effect of New vs. Retested was statistically significant (F (1,985) = 7.43, $p < .01$). The retested subjects had a higher mean score (.06) than the new subjects (-.11). As a result it was deemed reasonable to combine the data of the new and retested subjects for all further analyses.

The principal components analysis of the 1977 data resulted in four factors (see Table 35). Examination of Table 35 reveals a set of factors defined by items in a manner very similar to that which emerged in the analysis of the 1975 data. Factor I appears to be Interpersonal Relations, Factor II Human Ecology or Drugs, Factor III Concern with the Future, and Factor IV Education. Coefficients of congruence were computed to examine more analytically the similarity between the 1977 factor structure and that derived from the 1975 and 1976 data. The coefficients for the 1975 to 1977 comparisons ranged from $|.89|$ to $|.97|$ for like-factors. For the 1976 to 1977 comparison the Interpersonal Relations factor coefficient of congruence was $|.98|$. The Human Ecology or Drugs factor had a coefficient of congruence of $|.95|$. The Education and Concern with the Future factors had coefficients of congruence of $|.72|$ and $|.78|$, respectively, with the third factor that emerged from the analysis of the 1976 data. The analysis of the 1977 data, then, resulted in virtually the same set of factors as emerged from the analysis of the 1975 data. As with the 1975 to 1976 comparisons, the 1976 to 1977 comparisons revealed comparability of two factors, with the 1976 data showing a combined factor - Concern with the Future and Education.

Factor scores were calculated for each of the four factors and each was subjected to a 8(Grades) x 2(Sex) analysis of variance (see Table 37). Newman-Keuls tests were carried out to further investigate the grade level differences. For Factor I the fifth graders had a significantly ($p < .01$) lower mean score than the subjects in the other grades and the eighth graders had a significantly higher mean score than the fifth-, seventh-, and twelfth-graders ($p < .01$) and the sixth-, ninth-, tenth-, and eleventh-graders. On Factor II each of the grades six- ($p < .05$), eight- ($p < .01$), nine- ($p < .05$) and ten- ($p < .05$) had lower mean scores than the fifth-, eleventh-, and twelfth-graders. On Factor III the mean score of the seventh graders was significantly ($p < .05$) lower than the mean scores of the ninth-, eleventh-, or twelfth-graders. On Factor IV the fifth graders had a lower ($p < .01$) mean score than the tenth- or twelfth-graders, and the twelfth graders had a higher ($p < .05$) mean score than the sixth-, seventh-, eighth-, ninth-, or eleventh-graders.

The sex differences on Factor I reflected the higher mean score of the females (.01) than the males (M = .10). The females also had a higher mean score (.13) than the males (M = -.12) on Factor II.

The mean scores for the significant Sex x Grade interaction in the analysis of Factor III are presented in Table 38. Tests of simple effects revealed a sex difference only for the fifth graders (F (1,1108) = 6.47, $p < .05$). The Grade Level effect was significant for both the males (F (1,1108) = 2.68, $p < .05$) and the females (F (1,1108) = 3.43, $p < .01$). For the males Newman-Keuls tests indicated the mean score of the seventh graders was lower ($p < .05$) than that of the twelfth graders. For the females the fifth graders mean score was significantly lower than that of the eighth- ($p < .05$), and ninth- through twelfth-graders ($p < .01$). The sixth graders had a significantly lower mean score than the ninth- ($p < .05$) or eleventh-graders ($p < .01$).

Table 35

Varimax Factors from Analysis of Interest Ratings for 1977

Variable	Factor Loadings[a]				
	I	II	III	IV	
Love and marriage	.88				
Sexual relations and reproduction	.80				
Dating and going steady	.78				
Venereal disease		.72			
Birth control		.69			
Understanding other people		.43	.41		
Arts, crafts and sports			.75		
Future work	.30		.66		
Ecology		.44	.48		
Teachers and school				.63	
Drugs		.40		-.60	
Philosophy and religion				.55	
Science and math			.36	.50	
Medicine and health		.45		.45	
% of variance	15.8	13.5	11.6	11.6	52.5

a. Loadings less than .30 omitted for clarity.

Table 36

Summary of Analyses of Variance for 1977 Interest Factor Scores

Factor	Mean Squares			
	Sex	Grade	Sex x Grade	Error
I. (Interpersonal Relations)	7.77**	8.26***	1.52	.94
II. (Human Ecology or Drugs)	19.21***	4.99***	1.72	.95
III. (Concern with the Future)	.78	3.41**	2.54*	1.00
IV. (Education)	.92	3.88***	1.41	.97

Note: The degrees of freedom were 1 for sex, 7 for grade and 1108 for error.

* p .05
** p .01
*** p .001

Table 37

Mean Interest Factor Scores for 1977 Data

Factor	Grade							
	5	6	7	8	9	10	11	12
I. (Interpersonal Relations)	-.51	.04	-.16	.37	.05	.09	.02	-.09
II. (Human Ecology or Drugs)	.23	-.11	.04	-.23	-.07	-.09	.22	.30
III. (Concern with the Future)	-.11	-.15	-.22	.06	.12	.07	.18	.17
IV. (Education)	-.30	.00	-.04	-.04	-.02	.23	-.10	.30

Table 38

Means for the Sex x Grade Interaction in Analysis of Factor III of 1976 Interest Data

Sex	Grade							
	5	6	7	8	9	10	11	12
Male	.12	.01	-.30	.12	.06	.02	.08	.24
Female	-.49	-.37	-.14	.01	.20	.11	.27	.10

Change in interests. Change in interests was measured with both the interest rankings and interest ratings for the 328 subjects tested each of the three years for whom complete data were available. The mean rankings of the topics for these subjects are presented in Table 39. The correlations among the rankings in Table 39 were .95, .90, and .98 for the 1975-1976, 1975-1977, and 1976-1977 mean rankings, respectively. Significant differences due to year of testing are also listed in Table 39. The mean rankings for the topics Philosophy and religion, Science and math, Arts, crafts and sports, Understanding other people, and Ecology decreased over years of testing. The rankings of Love and marriage, Future work, and Dating and going steady increased over years, and the mean ratings of the topic Sexual relations and reproduction peaked in 1976, being lower in 1975 and 1977.

The mean ratings of each topic for each year for the retested subjects are listed in Table 40. The correlations were .96, .94, and .98 for the 1975-1976, 1975-1977, and 1976-1977 data, respectively. The mean ratings for the topics Philosophy and religion, Arts, crafts and sports, Venereal disease and Ecology declined over the years of the study (see Table 40). The mean interest ratings for the topics Love and marriage, Future work, and Dating and going steady generally increased over the years of the study. Interest ratings for the topic Sexual relations and reproduction peaked in 1976.

In order to further investigate changes in adolescent interests the ratings of interests for the retested subjects for each of the three years were subjected to a principal components analysis with varimax rotation. Factor scores were computed and each was subjected to a 6(Group) x 2(Sex) x 3(Years) analysis of variance, with repeated measures on the last factor.

The results of the factor analysis may be found in Table 41. Three factors accounting for 45.1% of the variance emerged. The first factor is the Interpersonal Relations factor that appeared in the factor analyses reported above. Factor II is the Human Ecology or Drugs factor that emerged in the previous analyses. The third factor was a combination of the Education and Concern with the Future factors that are reported above.[3]

Table 42 presents a summary of the within subjects portion of the analyses of variance of the factor scores. Since the between subjects portion of the analysis reflects effects averaged over the three testing periods of the study it is of little interest.

The mean factor scores for each factor are summarized in Table 43 for each year. The main effect of Year was significant only for Factor I. As may be seen in Table 43, interest in Interpersonal Relations declined over the three years of the study for the longitudinal sample. This finding is consistent with the grade level differences reported above. As may also be seen in Table 43, the mean scores for Factors II and III showed only small changes over the three testing periods.

The means for the significant Group x Years interaction for Factor I are reported in Table 44. For Groups 1 and 2 there was a significant ($p < .01$) drop in the mean score from 1975 to 1976. A similar decline occurred for group 5. Inspection of Table 44 reveals that, with the exception of Group 6, interest in Interpersonal Relations declined over the three testing periods. The increase in interest in Interpersonal Relations between 1976 and 1977 for Group 6 may reflect the approach of marriage for many of these subjects, who were in twelfth grade in 1977.

The only other significant effect in these analyses was the interaction between Group, Sex and Years in Factor II. Inspection of the means associated with this in-

Table 39

Mean Ranking of Each Topic in Each Year for Retested Subjects

Topic	Year			
	1975	1976	1977	*p*
Philosophy and religion	8.57	9.44	9.77	<.001
Medicine and health	5.65	5.86	6.32	
Science and math	7.08	7.62	7.96	<.01
Love and marriage	7.36	6.60	6.18	<.001
Future work	4.90	3.77	3.02	<.001
Arts, crafts and sports	4.53	4.82	5.32	<.05
Teachers and school	7.73	8.18	8.16	
Birth control	9.35	9.74	9.84	
Understanding other people	4.79	4.72	4.82	
Venereal disease	9.20	9.52	10.58	<.001
Sexual relations and reproduction	7.82	7.00	7.51	<.05
Drugs	10.80	11.32	10.76	
Dating and going steady	7.09	5.62	5.48	<.001
Ecology	7.07	7.74	8.23	<.001

Note: Degrees of freedom were 2 and 632 for the main effect of year of testing.

Table 40

Mean Rating of Each Topic in Each Year for Retested Subjects

Topic	Year 1975	 1976	 1977	p
Philosophy and religion	3.34	3.13	3.00	<.05
Medicine and health	4.38	4.57	4.43	
Science and math	4.30	4.18	4.03	
Love and marriage	4.40	4.77	4.90	<.01
Future work	5.76	5.85	6.09	<.05
Arts, crafts and sports	5.94	5.69	5.63	<.05
Teachers and school	3.83	3.75	3.63	
Birth control	3.08	3.23	3.23	
Understanding other people	5.25	5.19	5.36	
Venereal disease	3.54	3.55	3.14	<.05
Sexual relations and reproduction	4.08	4.73	4.46	<.001
Drugs	2.77	2.62	2.92	
Dating and going steady	4.60	5.10	5.09	<.01
Ecology	4.68	4.45	4.10	<.001

Note: Degrees of freedom were 2 and 632 for the main effect of year of testing.

Table 41

Varimax Factors from Analysis of Interest Ratings for Subjects Tested all Three Years[a]

Topic	Factor I	Factor II	Factor III	
Love and marriage	.87			
Dating and going steady	.85			
Sexual relations and reproduction	.79			
Venereal disease		.74		
Birth control		.65		
Ecology		.56		
Medicine and health		.56		
Arts, crafts and sports			.60	
Teachers and school			.57	
Future work	.36		.52	
Science and math			.46	
Philosophy and religion			.41	
Understanding other people	.33	.35	.38	
Drugs		.36	-.36	
% of Variance	17.2	15.1	12.8	45.1

a. Loadings less than .30 omitted for clarity.

Table 42

Summary of Analyses of Variance of Interest Factor Scores for Retested Subjects

Factor	Mean Squares				
	Years	Group x Years	Sex x Years	Group x Sex x Years	Error
I	7.12***	1.64**	.51	.29	.586
II	1.35	.81	.09	1.41*	.677
III	1.42	.81	.00	.85	.692

Note: The degrees of freedom were 2 for Years, 10 for Group x Years, 2 for Sex x Years, 10 for Group x Sex x Years, and 632 for error.

* $p < .05$
** $p < .01$
*** $p < .001$

Table 43

Mean Factor Scores for Retested Subjects for Each Year

Factor	1975	Year 1976	1977
I	.223	-.072	-.120
II	.086	.073	-.060
III	.060	-.060	-.099

Table 44

Means for the Group x Years Interaction
for Retested Subjects for Factor I

Group	1975	Years 1976	1977
1. Grades 5 to 6 to 7	.83	.15	.11
2. Grades 6 to 7 to 8	.26	-.44	-.49
3. Grades 7 to 8 to 9	.14	.00	-.18
4. Grades 8 to 9 to 10	-.30	-.12	-.25
5. Grades 9 to 10 to 11	.42	.04	-.06
6. Grades 10 to 11 to 12	.00	-.07	.15

teraction did not reveal any readily interpretable trends.

The Relation of Self-concept and Interests

One of the major purposes of the research was to examine the relation between adolescent self-concept and interests. This was seen as both a way to provide some construct validity for the factors derived from the self-concept analyses and as a way to begin to identify the antecedents of adolescent's interests and the personality correlates of the adolescents' interests.

Factor analytic analyses. One analytic strategy that was employed involved submitting the self-concept ratings and the ratings of interest in the various topics to a component analysis and extracting varimax factors. This was done separately for the data collected each year of the study, and was also done for the longitudinal sample.

The analyses done for each year's data collection may be found in Tables 45, 46 and 47 for the 1975, 1976 and 1977 samples. In only two instances did an interest topic appear with a primary loading on a self-concept factor. In the analysis of the 1975 data Arts, crafts and sports loaded positively with the Sex Role items (Hard, Strong and Rugged). In the 1976 data Drugs loaded negatively with the items defining Adjustment (Refreshed, Happy, Relaxed, Satisfied, Healthy, and Steady). Examination of the secondary loadings above the .30 level (chosen for clarity) also reveals little association between the self-concept and interest items. These analyses, then, indicate that the adolescent's self-concept and interests do not develop interrelatedly.

The component analysis for the longitudinal sample (see Table 48) substantiates the findings reported above. In only two instances did an interest have a primary loading with the self-concept items. Science and math loaded positively with items defining Achievement/Leadership (Smart, Superior, Sharp, Success, Valuable) and Arts, crafts and sports loaded positively with items defining Sex Role (Rugged, Hard, Strong and Leader). Again, secondary loadings above .30 in magnitude lend no significant support to self-concept and interests being meaningfully related in a factor analytic sense.

Canonical Correlation Analyses. In order to further investigate any possible relationships between self-concept and interests a series of canonical correlations were computed between factor scores derived from separate analyses of the self-concept and interest data. This was done separately for the data collected each year and for the longitudinal sample, which allowed examination of trends for both current relationships and pre- and post-diction of relationships across time. In effect, this procedure is comparable to longitudinal factor analysis.

Canonical correlation is a multivariate analysis by which we can identify the components of one set of variables that are most highly related, in a linear sense, to the components of another set of variables (Cooley & Lohnes 1976; Tatsuoka 1971). In our case, one set of variables was composed of the factor scores from analysis of the self-concept data and the other set was comprised of the factor scores from the analysis of the interest ratings. The basic question, then, concerned determining those combinations of self-concept and interest factor scores that were significantly linearly related. (See Tatsuoka (1971) for a discussion of significance tests for canonical correlation analysis).

The results of the canonical correlation analyses for the cross-sectional samples tested in 1975, 1976 and 1977 are presented in Tables 49, 50, and 51, respectively. Examination of these tables reveals several interesting findings. First, unlike the

Table 45

Varimax Factors from Analysis of Self-concept and Interest Ratings for 1975 Data (N = 811)

Variable[a]	Factor loading[b]						
	I	II	III	IV	V	VI	VII
Relaxed-nervous	.74						
Steady-shaky	.66						
Stable-unstable	.63						
Refreshed-tired	.59						
Healthy-sick	.56						
Happy-sad	.50		.42				
Satisfied-dissatisfied	.48	.36					
Smart-dumb		.68					
Sharp-dull		.65	.31				
Valuable-worthless	.33	.61					
Success-failure	.30	.59					
Superior-inferior		.59					
Confident-unsure	.40	.47					
Leader-follower		.32				.31	
Kind-cruel			.77				
Nice-awful			.76				
Friendly-unfriendly			.69				
Good-bad		.32	.58				
Love and marriage				.83			
Dating and going steady				.81			
Sexual relations and reproduction				.66			
Future work				.45			
Understanding other people			.30	.34	.32		
Teachers and school					.71		
Science and math					.59		
Medicine and health					.58		
Ecology					.51		
Philosophy and religion					.45		
Delicate-rugged						.70	
Hard-soft						.63	
Strong-weak		.36				.36	
Arts, crafts and sports						.52	-.31
Venereal disease							.69
Birth control							.68
Drugs							.60
% of variance 49.2	9.3	9.1	7.9	6.4	6.3	5.2	5.0

a. Positive pole listed at left to facilitate interpretation.

b. Loadings less than .30 in magnitude omitted.

Table 46

Varimax Factors from Analysis of Self-concept and Interest Ratings for 1976 Data (N = 793)

Variable[a]	Factor loadings[b]							
	I	II	III	IV	V	VI	VII	VIII
Success-failure	.73							
Valuable-worthless	.66							
Superior-inferior	.64							
Confident-unsure	.62							
Smart-dumb	.62							
Sharp-dull	.54							
Leader-follower	.50							
Stable-unstable	.40	.38						
Refreshed-tired	.32	.62						
Happy-sad		.60						
Relaxed-nervous	.35	.60						
Satisfied-dissatisfied	.33	.59						
Healthy-sick		.56						
Steady-shaky	.49	.52						
Drugs		-.37						-.37
Nice-awful			.79					
Kind-cruel			.74					
Friendly-unfriendly			.67					
Good-bad			.66					
Venereal disease				.71				
Birth control				.70				
Medicine and health				.68				
Ecology				.54				.35
Understanding other people				.48	.33			
Philosophy and religion				.48				.30
Love and marriage					.86			
Dating and going steady					.81			
Sexual relations and reproduction					.77			
Rugged-delicate						.73		
Hard-soft						.71		
Strong-weak	.34					.56		
Science and math							.77	
Teachers and school							.66	
Future work								.58
Arts, crafts and sports								.54
% of variance 54.2	11.1	8.0	7.8	7.2	6.7	5.3	4.3	3.8

a. Positive pole listed at left to facilitate interpretation.

b. Loadings less than .30 in magnitude omitted.

Table 47

Varimax Factors from Analysis of Self-concept and Interest Ratings for 1977 Data

(N = 1123)

Variable[a]	Factor loadings[b]							
	I	II	III	IV	V	VI	VII	VIII
Sharp-dull	.70							
Success failure	.64	.31						
Valuable-worthless	.64							
Superior-inferior	.63							
Smart-dumb	.63					.38		
Strong-weak	.60							
Leader-follower	.56							
Confident-unsure	.53	.36						
Rugged-delicate	.42		-.30			-.35	.33	
Relaxed-nervous		.78						
Steady-shaky	.30	.67						
Stable-unstable	.41	.58						
Healthy-sick		.55						
Refreshed-tired		.54						
Happy-sad	.31	.52	.30					
Satisfied-dissatisfied	.32	.48						
Nice-awful			.80					
Kind-cruel			.80					
Friendly-unfriendly			.72					
Good-bad	.30		.46					
Hard-soft	.36		.41					
Love and marriage				.87				
Dating and going steady				.79				
Sexual relations and reproduction				.78				
Birth control					.71			
Venereal disease					.71			
Medicine and health					.60			
Ecology					.48		.37	
Philosophy and religion					.43			
Understanding other people					.40		.30	
Science and math						.70		
Teachers and school						.67		
Arts, crafts and sports							.70	
Future work							.65	
Drugs								-.82
% of variance 53.7	11.9	8.8	7.8	6.4	6.0	5.0	4.4	3.4

a. Positive pole listed at left to facilitate interpretation.
b. Loadings less than .30 in magnitude omitted.

Table 48

Varimax Factors from Factor Analysis of Self-concept and Interest Ratings for Subjects Tested Each Year[a]

Item	Factor							
	I	II	III	IV	V	VI	VII	
Relaxed-nervous	.71							
Steady-shaky	.68							
Healthy-sick	.63							
Stable-unstable	.62							
Satisfied-dissatisfied	.61							
Refreshed-tired	.60							
Happy-sad	.59			.30				
Confident-unsure	.50	.37						
Smart-dumb		.61						
Superior-inferior		.61						
Sharp-dull		.58						
Success-failure	.48	.53						
Valuable-worthless	.42	.48						
Science and math		.48					.45	
Love and marriage			.87					
Dating and going steady			.84					
Sexual relations and reproduction			.78					
Nice-awful				.76				
Kind-cruel				.76				
Friendly-unfriendly				.72				
Good-bad		.42		.42				
Venereal disease					.72			
Birth control					.70			
Ecology					.58			
Medicine and health					.50		.38	
Drugs					.35		-.34	
Rugged-delicate						.70		
Hard-soft						.61		
Arts, crafts and sports						.48	.47	
Strong-weak	.35					.47		
Leader-follower	.30	.32				.40		
Teachers and school							.62	
Future work			.35				.56	
Philosophy and religion							.45	
Understanding other people			.30		.36		.37	
% of Variance	11.8	7.7	6.9	6.7	5.9	5.6	5.5	(50.1)

a. Loadings below .30 omitted for clarity.

Table 49

Significant Canonical Relationships from Analysis of 1975 Data for the Total Sample[a]

First Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Sex Role (.94)	Concern with the Future (.48)
Congeniality/Sociability* (.30)	Human Ecology or Drugs* (.30)
High Negative Weights	High Negative Weights
	Education (-.79)

Second Canonical Variate

Self-Concept Set	Interest Set
High Positive Weights	High Positive Weights
Achievement/Leadership (.59)	Concern with the Future (.74)
	Education (.52)
	Human Ecology or Drugs* (.37)
High Negative Weights	High Negative Weights
Adjustment* (-.71)	
Congeniality/Sociability* (-.39)	

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* Denotes factor defined by negative varimax weights in the factor analysis. In interpreting these factors special care must be taken to consider the signs of both the canonical weights and varimax weights.

[a] Numbers in parenthesis are the weights. Variables with weights less than .30 are omitted for clarity.

Table 50

Significant Canonical Relationships from Analysis of 1976 Data for the Total Sample[a]

First Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Achievement/Leadership* (.57)	
Congeniality/Sociability* (.40)	
High Negative Weights	High Negative Weights
Adjustment (-.67)	Education (-.96)

Second Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Congeniality/Sociability* (.71)	Interpersonal Relations* (.46)
Sex Role (.68)	
High Negative Weights	High Negative Weights
	Human Ecology or Drugs (-.89)

---

* Denotes factor defined by negative varimax weights in the factor analysis. In interpreting these factors special care must be taken to consider the signs of both the canonical weights and varimax weights.

[a] Numbers in parenthesis are the weights. Variables with weights less than .30 are omitted for clarity.

Table 51

Significant Canonical Relationships from Analysis of 1977 Data for the Total Sample[a]

First Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Congeniality/Sociability* (.77)	Education * (.80)
Sex Role (.34)	
High Negative Weights	High Negative Weights
Achievement/Leadership (-.52)	Interpersonal Relations (-.40)
	Concern with the Future (-.42)

Second Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Adjustment* (.39)	Human Ecology or Drugs (.79)
High Negative Weights	High Negative Weights
Sex Role (-.76)	Concern with the Future (-.59)
Achievement/Leadership (-.50)	

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* Denotes factor defined by negative varimax weights in the factor analysis. In interpreting these factors special care must be taken to consider the signs of both the canonical weights and varimax weights.

a. Numbers in parenthesis are the weights. Variables with weights less than .30 are omitted for clarity.

results from the factor analyses for the combined self-concept and interests data sets, significant relationships between the two data sets were identified. Two significant canonical relationships were identified in the analyses for each year. As was hypothesized, then, self-concept and interests are related.

Second, the two canonical relationships appear to be stable across the three years of the study. The first canonical variates in the 1975 and 1977 data sets, and the second canonical variate in the 1976 data sets, generally reflect the same relationship. Those who rate themselves low on the items defining Congeniality/Sociability and who rate themselves high on the items defining the Sex Role factor indicate they have a relatively low interest in items defining the Education, Concern with the Future, and Interpersonal Relations factors. The second consistent relationship, evidenced in the second canonical variates in the 1975 and 1977 data and the first canonical variate in the 1976 data, generally reflect a common relationship. Adolescents who rate themselves as relatively well adjusted, successful in achievement situations, congenial, and not rigidly masculine indicate they have a high interest in Education and Concern with the Future and a relatively low interest Human Ecology or Drugs.

The picture these data seem to portray may be summarized as follows. Adolescents who rate themselves as relatively unfriendly (and unpopular?) and as power oriented indicate they have little interest in the future and in preparing for it, e.g., through education. The more well adjusted adolescents, who feel successful in our achievement oriented society, who get along well with other people, and who are not rigidly tied to the masculine sex role orientation, indicate a high interest in planning for the future, for example, with respect to education.

Of course, the above analyses and results do not speak to either how these relationships might change over time or to the casual factors that might prevail in the relationships. In order to obtain data pertinent to these issues canonical relationships between the self-concept and interest factor scores were calculated for the longitudinal sample of subjects who had complete data for the self-concept inventory and the interest ratings for each of the three testing periods. First, the self-concept and interest data for these subjects were factor analyzed separately for each year. Then, the canonical correlations were computed between the self-concept and interest factor scores for all combinations of years of data collection. For example, canonical relationships were obtained between the factor scores derived from the 1975 self-concept data and the 1975, 1976, and 1977 interest data. A similar procedure was followed with the 1976 and 1977 self-concept data, each being related to the factor scores from the analysis of interest ratings from the same and other years. The results of these analyses may be found in Tables 52, 53, and 54, for the 1975, 1976 and 1977 self-concept data, respectively.

As may be seen, a number of significant canonical relationships emerged. The number of significant relationships increased from 1975 to 1976 to 1977, as did the number of across-year relationships. Examination of Tables 52, 53, and 54 reveals a number of similarities in the relationships that emerged across the years. One pattern is evidenced in the relationship between the 1975 self-concept and 1976 interests, the second variate in the 1976 self-concept to 1976 interests, and in the relationships between the 1977 self-concept and 1977 interests. Students who rated themselves as high achievers and as highly masculine rated their interest in Education as low and their concern with the Future as high. The low interest in Education may reflect the already high school achievement of adolescents who rate themselves high

Table 52

Significant Canonical Relationships between 1975 Self-concept Factor Scores and Interest Rating Factor Scores for Each Year[a]

1975 Interest Factor Scores

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Sex Role (.87)	Concern with the Future (.34)
Adjustment* (.41)	Human Ecology or Drugs* (.33)
High Negative Weights	High Negative Weights
	Education (-.86)

1976 Interest Factor Scores[b]

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Sex Role (.70)	Concern with the Future (.48)
Achievement/Leadership (.62)	
Congeniality/Sociability* (.33)	
High Negative Weights	High Negative Weights
	Education (-.83)

1977 Interest Factor Scores

No significant canonical relationships

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* Denotes factor defined by negative varimax weights in the factor analysis. In interpreting these factors special care must be taken to consider the signs of both the canonical weights and varimax weights.

[a] Numbers in parenthesis are the weights. Variables with weights less than .30 are omitted for clarity.

[b] p = .06 for this variate.

Table 53

Significant Canonical Relationships between 1976 Self-concept Factor Scores and Interest Rating Factor Scores for Each Year[a]

1975 Interest Factor Scores
No significant canonical relationships

1976 Interest Factor Scores

First Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Adjustment (.88)	Education (.68)
Congeniality/Sociability (.41)	Concern with the Future (.52)
High Negative Weights	High Negative Weights
	Interpersonal Relations * (-.42)
	Human Ecology or Drugs (-.31)

Second Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
	Education (.57)
High Negative Weights	High Negative Weights
Achievement/Leadership (-.82)	Concern with the Future (-.79)
Sex Role (-.57)	

1977 Interest Factor Scores

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Sex Role (.45)	Interpersonal Relations* (.48)
High Negative Weights	High Negative Weights
Congeniality/Sociability (-.66)	Education (-.76)
Adjustment (-.53)	Human Ecology or Drugs (-.43)

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* Denotes factor defined by negative varimax weights in the factor analysis. In interpreting these factors special care must be taken to consider the signs of both the canonical weights and varimax weights.

a. Numbers in parenthesis are the weights. Variables with weights less than .30 are omitted for clarity.

Table 54

Significant Canonical Relationships between 1977 Self-concept Factor Scores and Interest Rating Factor Scores for Each Year[a]

1975 Interest Factor Scores
No significant canonical relationships

1976 Interest Factor Scores

First Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Adjustment* (.79)	Interpersonal Relations* (.58)
Congeniality/Sociability* (.56)	
High Negative Weights	High Negative Weights
	Concern with the Future (-.60)
	Education (-.50)

Second Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Achievement/Leadership (.77)	Concern with the Future (.70)
	Interpersonal Relations* (.52)
	Human Ecology or Drugs (.49)
High Negative Weights	High Negative Weights
Sex Role (-.56)	

1977 Interest Factor Scores

First Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Congeniality/Sociability* (.65)	Interpersonal Relations* (.48)
Adjustment* (.32)	Concern with the Future* (.41)
High Negative Weights	High Negative Weights
Achievement/Leadership (-.65)	Education (-.77)

Second Canonical Variate

Self-concept Set	Interest Set
High Positive Weights	High Positive Weights
Adjustment* (.39)	Education (.62)
	Interpersonal Relations* (.56)
	Concern with the Future* (.50)
High Negative Weights	High Negative Weights
Sex Role (-.86)	

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* Denotes factor defined by negative varimax weights in the factor analysis. In interpreting these factors special care must be taken to consider the signs of both the canonical weights and varimax weights.

[a] Loadings less than .30 omitted for clarity.

on items defining the Achievement/Leadership factor (see below). The high interest in Concern with the Future probably indicates a high interest in continued success, vocation planning, and a career orientation. The picture one gets is of a striving, achievement oriented person. The pattern of results over the three years suggests that the self-views preceed the pattern of interests with which they are associated.

The second major pattern is discernable in the relationship between the 1976 self-concept and interest data (first variate), the 1977 self-concept and 1976 interest data (second variate), and the first variate in the 1977 self-concept and 1977 interest data. Adolescents who rate themselves as well adjusted and as congenial and friendly indicate they have a relatively high interest in items defining the Education, Concern with the Future, and Interpersonal Relations factors. The image one gets is of a generally well-adjusted person, interpersonally as well as individually. These people seem to accept themselves and others and seem to be future and other oriented.

A third, though not as strong, pattern of relationships may be seen in the variates involving the 1976 self-concept and 1977 ratings and the first variate in the 1977 self-concept and 1977 ratings. Adolescents who rated themselves low on the items defining the Congeniality/Sociability and Adjustment factors indicated low interest in the topics defining the Interpersonal Relations and Education factors. Adolescents who have adjustment problems and who are not particularly socially oriented indicate low interest in Education and Interpersonal Relations. It appears that these adolescents are relatively unhappy with themselves and avoid contact with others and feel they have little hope for the future. Their interests indicate they may be considered loners and perhaps as entering into escapist orientations.

Examination of the canonical relationships with an eye toward individual self-concept factors related to consistent patterns of interests is also revealing. High Sex Role is quite consistently related to low interest in Education and high ratings on Concern with the Future. High ratings on items defining Adjustment are consistently related to high interest in items defining Education and Concern with the Future. High ratings on Congeniality/Sociability relate to high interest in Education and Concern with the Future. There was also an indication that high Achievement/Leadership was associated with high interest in Education.

Social Class Differences in Adolescent's Self-concept and Interests

In order to examine social class differences in the structures of adolescent self-concept and interests for the samples tested each year separate factor analyses were done for lower- and middle-class subjects. Social class was determined by paternal occupation level, as described above (see Method). The samples for each year were divided at occupational level 5 in order to allow samples sufficiently large for factor analytic techniques. Following the factor analyses coefficients of congruence were computed to compare factor structures across social class within each year and within social class across years.

Analysis of the 1975 self-concept data resulted in five factors for the lower class subjects and four factors for the middle class subjects (see Tables 55 and 56). Examination of the coefficients of congruence for these data (see Table 57) indicates a high degree of structural similarity across social class, with the responses of the lower class subjects perhaps evidencing a distinction between achievement and leadership and with the middle class subjects grouping leadership with the masculine sex role. A similar set of findings emerged in the analyses of the 1976 data (see Tables 58 and 59). The data for the 1977 samples (see Tables 60 and 61) are less clear.

Table 55

Varimax Factors from Analysis of Lower Social Class Subjects in 1975 (N = 402)

Variable[a]	Factor loadings[b]				
	I	II	III	IV	V
Relaxed-nervous	.71				
Steady-shaky	.68				
Stable-unstable	.68				
Healthy-sick	.55				
Happy-sad	.51	.47			
Refreshed-tired	.51				
Confident-unsure	.48		.30		
Satisfied-dissatisfied	.48	.42			
Nice-awful		.76			
Kind-cruel		.76			
Friendly-unfriendly		.70			
Good-bad		.62			
Smart-dumb			.82		
Valuable-worthless			.53	.37	
Success-failure	.34		.52		
Sharp-dull		.32	.50	.44	
Leader-follower				.72	
Superior-inferior			.32	.70	
Strong-weak	.32			.49	
Hard-soft					.82
Rugged-delicate					.72
% of variance 54.4	15.1	13.3	9.8	9.4	6.8

a. Positive pole listed at left to facilitate interpretation
b. Loadings less than .30 in magnitude omitted.

Table 56

Varimax Factors from Analysis of Middle Social Class Subjects in 1975 (N = 335)

Variable[a]	Factor loadings[b]			
	I	II	III	IV
Success-failure	.71			
Smart-dumb	.70			
Valuable-worthless	.67	.47		
Sharp-dull	.64			
Good-bad	.50		.47	
Confident-unsure	.48	.37		
Superior-inferior	.46	.34		.39
Relaxed-nervous		.80		
Steady-shaky		.66		.30
Refreshed-tired	.34	.65		
Stable-unstable		.54		
Satisfied-dissatisfied	.46	.53		
Healthy-sick		.51	.31	
Happy-sad	.30	.47	.35	
Nice-awful			.82	
Kind-cruel			.82	
Friendly-unfriendly			.68	
Rugged-delicate				.79
Hard-soft				.77
Strong-weak	.42			.46
Leader-follower		.31		.40
% of variance 54.5	16.3	15.3	12.7	10.2

a. Positive pole listed at left to facilitate interpretation.

b. Loadings less than .30 in magnitude omitted.

Table 57

Coefficients of Congruence for Factors of Self-Concept for Lower- and Middle-Class Subjects for Each Year

Year	Lower Class Factor	Middle Class Factor				
1975		I	II	III	IV	
	I	.63	.96	-.44	-.33	
	II	.57	.49	-.93	.05	
	III	-.89	-.47	.37	.28	
	IV	-.67	-.51	-.93	.05	
	V	-.15	-.14	-.05	.83	
1976		I	II	III	IV	
	I	.93	-.49	-.58	.50	
	II	.49	-.92	-.40	-.05	
	III	.47	.02	-.37	.88	
	IV	-.72	.35	.88	-.46	
	V	.33	-.46	-.75	.23	
1977		I	II	III	IV	V
	I	-.91	.79	.43	.55	.24
	II	.58	-.78	-.40	-.89	-.28
	III	.31	-.44	-.95	-.33	.10
	IV	-.52	.13	-.15	.40	-.15

Table 58

Varimax Factors from Analysis of Lower Social Class Subjects in 1976 (N = 434)

Variable[a]	Factor loadings[b]				
	I	II	III	IV	V
Success-failure	.75				
Valuable-worthless	.73				
Confident-unsure	.64				
Smart-dumb	.54	.31			
Leader-follower	.48	.35			
Sharp-dull	.48	.39			
Refreshed-tired		.67			
Relaxed-nervous		.65		.32	
Satisfied-dissatisfied		.62	.37		
Superior-inferior	.45	.58			
Steady-shaky	.33	.52			.30
Stable-unstable		.51		.37	
Nice-awful			.78		
Good-bad			.74		
Friendly-unfriendly			.70		
Kind-cruel			.68		
Hard-soft				.80	
Rugged-delicate				.75	
Strong-weak				.59	
Healthy-sick					.72
Happy-sad		.31			.67
% of variance 57.7	14.1	13.8	12.7	9.9	7.2

a. Positive pole listed at left to facilitate interpretation.

b. Loadings less than .30 in magnitude omitted.

Table 59

Varimax Factors from Analysis of Middle Social Class Subjects in 1976 (N = 291)

Variable[a]	Factor loadings[b]			
	I	II	III	IV
Success-failure	.72			
Confident-unsure	.65			
Valuable-worthless	.65	.38		
Smart-dumb	.62	.32		
Superior-inferior	.60			.41
Stable-unstable	.55		.40	
Sharp-dull	.40	.36		.39
Nice-awful		.78		
Kind-cruel		.76		
Friendly-unfriendly		.74		
Good-bad	.42	.51		
Satisfied-dissatisfied		.33	.68	
Refreshed-tired			.66	
Healthy-sick			.64	
Relaxed-nervous	.35		.63	
Happy-sad		.46	.59	
Steady-shaky	.46		.53	
Leader-follower	.37		.38	.35
Rugged-delicate				.76
Hard-soft				.69
Strong-weak				.63
% of variance 54.9	16.5	14.2	14.2	10.0

a. Positive pole listed at left to facilitate interpretation.
b. Loadings less than .30 in magnitude omitted.

Table 60

Varimax Factors from Analysis of Lower Social Class Subjects in 1977
(N = 706)

Variable[a]	Factor loadings[b]			
	I	II	III	IV
Valuable-worthless	.69			
Smart-dumb	.69			
Success-failure	.66			
Sharp-dull	.62			
Superior-inferior	.59	.30		
Satisfied-dissatisfied	.54	.44		
Confident-unsure	.54	.35		
Good-bad	.49		.36	
Strong-weak	.48			.44
Relaxed-nervous		.72		
Steady-shaky		.64		
Refreshed-tired		.60		
Healthy-sick		.58		
Stable-unstable	.34	.55		
Happy-sad		.53	.33	
Nice-awful			.79	
Kind-cruel			.79	
Friendly-unfriendly			.77	
Hard-soft				.72
Rugged-delicate				.70
Leader-follower		.34		.42
% of variance	17.6	14.6	11.6	8.8

a. Positive pole listed at left to facilitate interpretation.
b. Loadings less than .30 in magnitude omitted.

Table 61

Varimax Factors from Analysis of Middle Social Class Subjects in 1977 (N = 379)

Variable[a]	Factor loadings[b]				
	I	II	III	IV	V
Leader-follower	.70				
Sharp-dull	.64				
Superior-inferior	.63				
Success-failure	.56	.46			
Confident-unsure	.53			.52	
Strong-weak	.47			.35	.44
Refreshed-tired		.70			
Healthy-sick		.64			
Happy-sad		.59		.31	
Smart-dumb	.49	.56			
Satisfied-dissatisfied		.55		.33	
Valuable-worthless	.41	.51			
Nice-awful			.83		
Kind-cruel			.82		
Friendly-unfriendly			.77		
Good-bad		.32	.45		
Relaxed-nervous				.81	
Steady-shaky				.71	
Stable-unstable				.66	
Rugged-delicate					.82
Hard-soft					.73
% of variance 58.3	13.4	13.3	11.9	11.8	7.9

a. Positive pole listed at left to facilitate interpretation.
b. Loadings less than .30 in magnitude omitted.

The Achievement/Leadership, Congeniality/Sociability, and Adjustment factors emerged in both the lower- and middle-class data, but Factor V in the middle-class data had no counterpart in the lower class data.

The above data suggest only minimal, if any, social class differences in the factor structure of the self-concept. And, the data suggest little change in these factor structures across the three testing periods. This latter implication was tested by computing coefficients of congruence within social classes across years. These coefficients indicated a moderate to high degree of similarity (coefficients of congruence above .80) for both social classes across the three testing periods.

Similar procedures were employed to assess social class effects in the factor structure of adolescent interests. Analysis of the 1975 data (see Tables 62 and 63) resulted in four factors for the lower class and five factors for the middle class subjects. Analysis of the 1976 (see Tables 64 and 65), and 1977 (see Tables 66 and 67) data resulted in four factors for both the lower- and middle-class subjects in each year.

Examination of Table 68, in which the coefficients of congruence are presented for the two social classes within each year, indicates that for the 1975 and 1976 data there is only a moderate degree of factor structure similarity for the two social classes. The coefficients of congruence for the factor structures resulting from the 1977 data were very high for the like-factors (see Table 68).

Coefficients of congruence were calculated for similar social class levels across the three times of testing. In general, the coefficients indicated a moderately high degree of structural similarity across years of testing for both social classes. This was especially true for the Interpersonal Relations factor, the coefficients being above .90 for all comparisons.

Relationships Between Self-concept and School Achievement

Several types of comparisons were made to explore the relationship between components of self-concept and the various achievement test and IQ scores. Component scores for the self-concept were obtained from a component analysis of the self-concept data. The data for each subject for each time of testing were entered into one global component analysis, with the components rotated to the varimax criterion. Component scores were then computed for each subject for each time of testing. For the fifth- through eighth-graders the achievement test scores used were the composite scores for the Reading, Language and Mathematics subtests from the IOWA Achievement Tests. The Verbal, Quantitative, and Nonverbal IQ tests scores from the Cognitive Abilities Test were used as measures of intelligence for the fifth- through eighth-graders. Stanford Achievement Test composite scores for Reading, English, and Mathematics and the IQ scores from the Otis-Lenon Mental Abilities Test were used for subjects in grades nine through twelve.

The self-concept factor scores were correlated with the achievement test and IQ scores for each year for subjects with complete data only. These correlational analyses were conducted separately for each grade and sex combination in order to examine the developmental trends and sex differences that may exist in these data as indicated in the literature review. In addition, correlations were computed for the total group of subjects in each grade/sex combination collapsed over all three testings.

The only consistent findings that emerged were associated with the Achievement/Leadership Factor score. The Congeniality/Sociability, Adjustment, and Sex Role Factor scores were only sporadically significantly correlated with the achievement and IQ measures. The correlations between the Achievement/Leadership factor scores and

Table 62

Varimax Factors from Analysis of Interest Ratings for 1975 Data for Lower Social Class Subjects (N = 402)

Topic	Factor				
	I	II	III	IV	
Love and marriage	.80				
Dating and going steady	.78				
Sexual relations and reproduction	.75				
Future work	.47	.35			
Teachers and school		.73			
Philosophy		.62		-.34	
Science and math		.56			
Medicine and health		.56	.44		
Ecology		.47	.38	.30	
Venereal disease			.71		
Birth control			.66		
Drugs		.30	.66		
Understanding other people	.34	.30	.35		
Arts, crafts and sports				.83	
% of variance	15.9	15.2	13.5	8.3	52.9

Table 63

Varimax Factors from Analysis of Interest Ratings for 1975 Data for Middle Social Class Subjects (N = 334)

Topic	Factor I	II	III	IV	V
Love and marriage	.88				
Dating and going steady	.86				
Sexual relations and reproduction	.68				
Venereal disease		.74			
Birth control		.70			
Drugs		.66			
Medicine and health			.72		
Teachers and school			.64		.35
Philosophy and religion			.61		-.43
Science and math			.54	.40	
Arts, crafts and sports				.80	
Ecology		.36		.72	
Future work					.72
Understanding other people					.55
% of variance	15.6	13.4	12.4	10.3	9.4

Table 64

Varimax Factors from Analysis of Interest Ratings for 1976 Data for Lower Social Class Subjects (N = 434)

Topic	Factor I	II	III	IV
Medicine and health	.69			
Birth control	.69			
Venereal disease	.66			
Philosophy and religion	.56			
Ecology	.50			.33
Understanding other people	.46	.36		
Love and marriage		.86		
Dating and going steady		.81		
Sexual relations and reproduction		.78		
Science and math			.67	
Teachers and school			.65	
Arts, Crafts and sports			.56	
Drugs				.74
Future work			.41	.56
% of variance	16.7	16.0	11.7	7.8

Table 65

Varimax Factors from Analysis of Interest Ratings for 1976 Data for Middle Social Class Subjects (N = 291)

Topic	Factor I	Factor II	Factor III	Factor IV
Love and marriage	.88			
Dating and going steady	.82			
Sexual relations and reproduction	.79			
Teachers and school		.72		
Understanding other people	.32	.61		
Future work	.34	.54		
Science and math		.49		
Philosophy and religion		.46		
Venereal disease			.78	
Birth control			.74	
Medicine and health		.42	.59	
Drugs				-.66
Arts, crafts and sports				.64
Ecology		.32		.53
% of variance 54.2	17.4	14.9	12.2	9.7

Table 66

Varimax Factors from Analysis of Interest Ratings for 1977 Data for Lower Social Class Subjects (N = 703)

Topic	Factor			
	I	II	III	IV
Love and marriage	.87			
Sexual relations and reproduction	.81			
Dating and going steady	.78			
Venereal disease		.75		
Birth control		.69		
Medicine and health		.46	.44	
Understanding other people		.40		.36
Teachers and school			.66	
Science and math			.57	.34
Drugs		.42	-.54	
Philosophy and religion			.52	
Arts, crafts and sports				.77
Future work	.34			.64
Ecology		.43		.49
% of variance 53.1	16.1	12.0	13.7	11.3

Table 67

Varimax Factors from Analysis of Interest Ratings for 1977 Data for Middle Social Class Subjects (N = 378)

Topic	Factor			
	I	II	III	IV
Love and marriage	.88			
Sexual relations and reproduction	.81			
Dating and going steady	.78			
Philosophy and religion		.64		
Medicine and health		.58		
Teachers and school		.57		
Science and math		.44		
Arts, crafts and sports			.79	
Future work			.70	
Ecology			.48	.30
Understanding other people			.48	.43
Birth control				.68
Drugs		-.55		.58
Venereal disease		.33		.58
% of variance 53.1	15.7	13.4	12.8	11.2

Table 68

Coefficients of Congruence for Interest Factors for Lower- and Middle-Class Subjects for Each Year

Year	Lower Class Factor	Middle Class Factor				
1975		I	II	III	IV	V
	I	.95	.32	.05	.07	-.44
	II	.04	.12	.93	.48	-.39
	III	-.26	.94	-.26	-.12	.27
	IV	-.01	-.17	-.09	.78	-.41
1976		I	II	III	IV	
	I	-.14	,65	-.91	.09	
	II	-.97	.19	-.23	.00	
	III	-.06	.76	-.13	.59	
	IV	-.26	.43	-.11	-.17	
1977		I	II	III	IV	
	I	-.96	.06	-.20	-.18	
	II	.18	-.48	.27	.95	
	III	.01	.96	-.41	-.16	
	IV	.11	-.28	.97	.27	

the achievement and IQ scores are presented in Tables 69 (for grades 5-8) and 70 (for grades 9-12). As may be seen in Table 69, with increasing grade levels the number of significant correlations increased as did the magnitude of the correlations. Similar patterns of relationships were observed for both the males and the females. Correlations between IQ and Achievement/Leadership factor scores showed trends similar to those that occurred with the achievement test scores.

The data for the ninth- through twelfth-graders (Table 70) is not as consistent as the data from the earlier grade levels. The correlations for the males are somewhat stronger than those for the females at the ninth-grade level, with the reverse being the case at the tenth- and eleventh-grade levels. At the twelfth grade level few correlations were significant for either sex. In general, the correlations that were statistically significant were as high or higher in magnitude as the ones at the earlier grade levels. The correlations with IQ scores generally followed the same pattern as that for the achievement test scores.

Table 69

Correlations Between Achievement/Leadership Factor Scores and Achievement and IQ Scores -- Grades 5-8^{a}

Grade	Sex	Year	n	Test Score^{b}					
				Read.	Lang.	Math.	VIQ	QIQ	NVIQ
5	Male	1975	60	22	25^{x}	31^{xx}	19^{x}	16	02
		1976	53	19	25	27^{x}	26^{x}	29^{x}	16
		1977	55	33^{x}	09	17	15	07	-06
		Total	168	26^{xx}	25^{xx}	31^{xx}	19^{x}	16	02
	Female	1975	52	05	13	10	05	03	10
		1976	45	39^{xx}	47^{xx}	45^{xx}	26	34^{x}	26
		1977	37	03	18	13	00	19	10
		Total	134	14	24^{x}	20^{x}	07	17	15
6	Male	1975	50	-08	16	22	04	15	08
		1976	71	28^{x}	39^{xx}	38^{xx}	32^{xx}	33^{xx}	27^{x}
		1977	72	16	23	17	10	01	09
		Total	193	13	26^{xx}	25^{xx}	18^{x}	16	13
	Female	1975	53	11	11	20	15	23	23
		1976	59	43^{xx}	41^{xx}	43^{xx}	33^{xx}	32^{x}	31^{x}
		1977	56	23	16	28^{x}	17	25	21
		Total	168	26^{xx}	22^{x}	30^{xx}	22^{x}	25^{xx}	21^{x}
7	Male	1975	47	24	42^{xx}	40^{xx}	21	41^{xx}	38^{xx}
		1976	62	27^{x}	12	37^{xx}	17	14	32^{x}
		1977	97	45^{xx}	52^{xx}	49^{xx}	40^{xx}	44^{xx}	37^{xx}
		Total	206	34^{xx}	37^{xx}	42^{xx}	28^{xx}	33^{xx}	35^{x}
	Female	1975	35	21	37^{x}	27	29	39^{xx}	24
		1976	64	33^{xx}	40^{xx}	30^{xx}	41^{xx}	37^{xx}	17
		1977	89	41^{xx}	37^{xx}	40^{xx}	48^{xx}	42^{xx}	26^{xx}
		Total	188	35^{xx}	37^{xx}	34^{xx}	42^{xx}	40^{xx}	23^{x}
8	Male	1975	53	17	29^{x}	26	17	15	16
		1976	27	37	27	58^{xx}	32	52^{xx}	35
		1977	80	31^{xx}	36^{xx}	35^{xx}	32^{xx}	32^{xx}	24^{x}
		Total	160	27^{xx}	31^{xx}	35^{xx}	27^{xx}	29^{xx}	23^{x}

Table 69 Continued

Grade	Sex	Year	n	Test Score[b]					
				Read.	Lang.	Math.	VIQ	QIQ	NVIQ
8	Female	1975	51	07	06	19	09	08	31^{x}
		1976	37	40^{x}	43^{xx}	29	47^{xx}	41^{x}	21
		1977	90	32^{xx}	23^{x}	34^{xx}	27^{xx}	23^{x}	07
		Total	178	25^{xx}	19^{x}	25^{xx}	26^{xx}	23^{x}	16

a. Decimal points omitted.
b. Read. = Reading, Lang. = Language, Math. = Mathematics, VIQ = Verbal IQ, QIQ = Quantitative IQ, NVIQ = Nonverbal IQ.

x $p<.05$
xx $p<.01$

Table 70

Correlations Between Achievement/Leadership Factor Scores and Achievement and IQ Scores -- Grades 9-12[a]

Grade	Sex	Year	n	Test Score[b]			
				Read.	Eng.	Math.	IQ
9	Male	1975	51	32^{xx}	29^{x}	39^{x}	18
		1976	72	40^{xx}	42^{xx}	51^{xx}	44^{xx}
		1977	55	42^{xx}	39^{xx}	43^{xx}	41^{xx}
		Total	178	38^{xx}	36^{xx}	42^{xx}	34^{xx}
	Female	1975	44	24	27	20	20
		1976	64	02	00	13	03
		1977	74	41^{xx}	32^{xx}	45^{xx}	40^{xx}
		Total	182	25^{xx}	22^{x}	30^{xx}	24^{xx}
10	Male	1975	47	11	06	20	14
		1976	36	31	27	35^{x}	27
		1977	68	12	20	16	10
		Total	151	13	17^{x}	22^{x}	16^{x}
	Female	1975	45	41^{xx}	35^{x}	53^{xx}	37^{x}
		1976	41	24	38^{x}	33^{x}	36^{x}
		1977	83	12	04	20	20
		Total	169	24^{xx}	24^{xx}	34^{xx}	30^{xx}
11	Male	1975	50	19	02	08	20
		1976	26	35	32	51^{x}	26
		1977	43	18	22	29^{x}	35^{xx}
		Total	119	22^{x}	18^{x}	22^{x}	27^{xx}
	Female	1975	47	38^{xx}	44^{xx}	49^{xx}	28
		1976	21	44^{x}	51^{x}	57^{xx}	51^{x}
		1977	42	46^{xx}	44^{xx}	36^{xx}	39^{x}
		Total	110	40^{xx}	43^{xx}	44^{xx}	45^{xx}
12	Male	1975	41	14	10	09	44^{xx}
		1976	18	-02	-04	-03	02
		1977	37	43^{xx}	15	41^{x}	42^{x}
		Total	96	22^{x}	19	17	29^{xx}

Table 70 Continued

Grade	Sex	Year	n	Test Score[b]			
				Read.	Eng.	Math.	IQ
12	Female	1975	30	-20	-04	-17	-04
		1976	12	61^{x}	71^{xx}	76^{xx}	83^{xx}
		1977	27	04	21	38^{x}	30
		Total	69	09	22	23^{x}	18

a. Decimal points omitted.
b. Read. = Reading, Eng. = English, Math. = Mathematics.

x $p < .05$
xx $p < .01$

Discussion

The purpose of this research was to study grade level differences and changes in self-concept and to relate these to grade level differences and changes in interests during the adolescent years. The intent of these investigations was to provide data pertinent to the issue of identity crises, or identity changes, that are hypothesized to occur during adolescence. Information relevant to shifts in interests, and changes in the relation of self-concept to interests was also sought. The data collected also allowed the investigation of the relation of self-concept and interests to socioeconomic status and school achievement. The data relevant to each of these issues are discussed below, in relation both to the empirical study of self-concept and interests during adolescence and to theoretical conceptualizations regarding the development of adolescent self-concept and interests. The final section of the discussion is an attempt to formulate meaningful questions for further research programs aimed at clarifying self-concept in the context of adolescence.

Results from Adolescent Self-Concept

The semantic differential self-concept instrument used in the present research is the same as that used previously by Monge (1973, 1975) to study self-concept during the adolescent and adulthood years. Monge reported four varimax factors in each of his studied: Achievement/Leadership, Congeniality/Sociability, Adjustment, and Sex Role. When the data from each testing of the current study were subjected to varimax analysis four factors emerged. Coefficients of congruence (Harmon, 1967) were calculated to compare the factor structures across the three data sets. These coefficients revealed to a high degree of stability in factor structure and indicated that the scale used consistently measured the same components of self-concept at each of the three testing points. Moreover, when the current data were compared to Monge's (1973) data the coefficients of congruence were equally high, indicating that the factor structure found in the present study was virtually identical to that reported by Monge for an adolescent sample tested between 15 and 18 years earlier.

The particular semantic differential scale used in the present study has now been used with eight samples of subjects. In each instance, varimax analysis of the data sets resulted in the four factors listed above. Clearly, the scale has a very suitable degree of factor stability. The growing list of studies in which this scale was used makes it increasingly acceptable for assessing construct validity of the scale (cf., Wylie, 1974), which was a secondary purpose of the research. Moreover, however, it is also possible to determine if similar developmental trends have emerged from comparable samples. We turn next to a discussion of these issues.

Following each varimax analysis factor scores were calculated and were subjected to analysis of variance in order to assess grade level and sex differences. The sex differences generally replicated each other across the three testing periods. Males had higher scores on the Sex Role factor than females on each testing. Males also scored higher than females on the Achievement/Leadership factor in 1975 and 1977, with the sex difference reversed for the 1976 data. Sex differences on the Adjustment and Congeniality/Sociability factors indicated that in 1976 and 1977 males had higher scores than females on the Congeniality/Sociability factor, with no sex differences on the Adjustment factor either year. Males had higher scores than females on the Adjustment factor in 1975, with no sex differences on the Congeniality/Sociability factor emerging that year. Finally, when the females' scores on the Sex Role factor were reanalyzed after being multiplied by -1 all main effect sex differences disappeared, indicating that the initial sex differences were an artifact of the scoring system (cf., Monge, 1973).

Generally speaking, the sex differences that emerged from the data collected in this study replicate over times of testing. And, the sex differences for the Achievement/Leadership and Sex Role factors replicate those reported earlier by Monge (1973) for a similar adolescent sample. The findings for the rescored female data on the Sex Role factor also replicate Monge's earlier findings. It seems safe to conclude, then, that during adolescence males perceive themselves ad more achievement oriented than girls, with both sexes perceiving themselves as appropriately sex typed. These findings are consistent with other literature demonstrating a higher achievement orientation among males than females during adolescence and with literature indicating the stability of sex-typed characteristics during the adolescent years (e.g., Broverman, Vogel et al., 1972; Rosenkrantz, Vogel et al., 1968). The consistency of these findings, and the content of the items composing the two factors, suggest that what may be measured by these two factors is two components of sex roles as generally conceived. That is, the items composing the Sex Role factor may represent physical prowess, and the items composing the Achievement/Leadership factor may represent a masculine orientation toward achievement, with a stress on a high degree of competence. To the degree that this is true, the two factors may both measure components of sex roles, thereby making the instrument a much narrower one for measuring self-concept than originally thought.

A comparison of the sex differences in factor scores reported in this study with those reported by Monge (1973) reveals several failures to replicate. Monge reported that females had a higher mean score than males on the Congeniality/Sociability factor and that males had a higher mean score than the females on the Adjustment factor. In the present study males had a higher mean score than females on the Congeniality/Sociability factor in 1976 and 1977, with no sex difference in 1975. In 1975 males did have a higher mean score than females on the Adjustment factor, but no sex differences were evidenced in 1976 and 1977. The most ready explanation for the failure of consistency in these sex differences is that they reflect relatively transitory states of the individual and no long-term, stable differences in self-concepts. Although one may suspect that girls ought to be more congenial and sociable than boys because of sex differences in socialization (cf., Maccoby & Jacklin, 1974), it may be that the peer group is used as the reference for indicating standing on these adjectives. If this is the case, there appears to be no ready theoretical reason for sex differences in Congeniality/Sociability. It is equally difficult to derive a satisfactory explanation for sex differences in Adjustment, although two of the four relevant comparisons reveal males with the higher mean score. Although it is tempting to suggest that the adjectives defining the Adjustment factor are sex-typed in the masculine role, perhaps in the sense of keeping a cool head under pressure, it is speculation that must await further research.

As was noted in the introduction and literature review of this report, popular views and theoretical conceptualizations of adolescence attribute a restructuring of the self to the adolescent period of development. For some (e.g., McCandless, 1970; A. Freud, 1948, 1958) this is the result of the emergence of a new drive - the sex drive - that emerges during adolescence as a result of the physiological changes that occur during puberty. For others (e.g., Erikson, 1963; Marcia, 1975, 1976) it is the result of a psychosocial conflict reflecting adolescent independence strivings and changing identities. Whatever the etiology, a significantly large portion of the literature on adolescent development deals with the concept of major identity changes as an important aspect of adolescence (cf., Wolf, Gedo, & Terman, 1972). The significant Grade Level effects that resulted from the analysis of the factor scores for each year generally support the concept of a restructuring of the self during adolescence.

However, a perusal of the Grade Level differences associated with each year's data reveals little of consistency in the findings. Although younger subjects tend to respond in a more masculine way than older subjects on those items defining the Sex Role factor, grade level differences emerging from analysis of the other factor scores reveal no consistent trends across the three samples. It is of interest to note further that with the exception of the differences associated with Sex Role factor, the other grade level effects were not especially consistent with those reported by Monge (1973). Nor are these data particularly consistent with other research (e.g., Katz & Zigler, 1967; Simmons et al., 1973) in which grade level (or age) differences in adolescent self-concept have been reported.

The failure of the grade level differences reported for each of the three samples of the present study to replicate each other or to replicate the findings earlier reported by Monge (1973) have several implications for the study of adolescent self-concept. First, the data suggest that the semantic differential scale used is somewhat more sensitive to momentary states of the subjects than may be desirable. Since all testing was done in all grade levels within a few days, and since differential developmental differences emerged from the analyses each year, it seems reasonable to conclude that the differences reported were short-term as opposed to long-term fluctuations in the self-concept. In other words, although the scales used produce factorially stable dimensions of the self, grade level differences and, as we noted above, sex differences, seem to be the product of relatively immediate situational variables. These factors apparently outweigh any long-term, stable sociocultural factors that would be reflected in consistent age differences over the three times of testing. As a result, one must interpret the developmental implications of age difference studies of self-concept with a high degree of caution.

A second important aspect of the failure to replicate grade level differences lies in a set of implications for data that support the concept of significant changes in self-concept during the adolescent years. Since the majority of research findings cited to support the concept of significant and dramatic changes in self-concept during the adolescent years come from cross-sectional studies, the present findings cast doubt on the hypothesis that such changes occur in reality. If the hypothesis of significant change were true it would be expected that age differences for each time of testing in this study would be roughly comparable in the analyses of the data from each testing time. The failure for this to occur indicates that other factors influence grade level differences at any one testing time and that the more salient findings of relevance to the hypothesis of significant changes in self-concept must come from the longitudinal study of self-concept during adolescence.

The longitudinal findings of the present investigation may be summarized easily. For each of the six groups of subjects tested each of the three years of the study there were no significant differences due to time of measurement. Nor was there a significant interaction between group and time of measurement for any of the factors of self-concept. The results for the longitudinal sample, then, indicate no significant changes in any component of the self-concept during the adolescent years. Since the subjects in the various groups spanned the age period from about 11 to 18, these findings suggest that neither the broad ranging biological changes of adolescence nor the shifts in school levels (i.e., elementary to middle to high school) result in permanent changes in the adolescent's self-concept. These findings replicate earlier research (e.g., Engel, 1959; Carlson, 1965; Constantinople, 1969) in which longitudinal assessments of adolescents' self-concept was made. In these studies different instruments and varying age spans were represented. However, the findings point to stability in adolescent self-concept, not to change and certainly not to dramatic change. The failure of the present investigation, and that of others, to demonstrate significant and wide-spread change in adolescents' self-concept has a number of implications.

First, the results reviewed in the above paragraph suggest that theoretical views of adolescence as a time of significant and wide-ranging shifts in self-concept are incorrect. At least across the three year intervals of the current study, no such changes were apparent. Had these same subjects been studied for several more years it is possible that significant changes would have been detected. However, because of the overlapping nature of the grade levels studied over the three years this possibility seems unlikely. The failure to find significant grade level x time of measurement interactions indicates that similar magnitudes of development were occurring for all groups over the three years. The lack of changes over the three years is entirely consistent with the view that important influences on self-concept, such as puberty, changing grade levels and schools, the approach of school graduation, and the like do not signify a complete restructuring of the concept of the self. Rather, these influences may affect a momentary change, as reflected in the cross-sectional data, for example, that has little impact on the consistency of self-views over time. The impact of these changes is not immediate, but is an occurrence that takes place over some time interval encompassing several months or years. This time interval allows the integration of the impending change into the existing structure of the self. This integration, too, takes place over some time interval, the result being that it may have little if any impact on the individual's conceptualization of self, which should have a significant degree of stability over time (Erikson, 1963). The present findings, then, as well as those of other longitudinal investigations, are entirely consistent with the view that the self-concept must exhibit consistency over time. The "person" or "self" that enters adolescence is basically similar to the "person" or "self" that emerges from it into adulthood.

The view being expressed here is also consistent with the earlier statements indicating that the semantic differential scales of self-concept are sensitive to immediate, albeit momentary, environmental influences. The age differences reported above may reflect the relatively immediate impact of school changes, emergent puberty, failure or poor performance in school, and other influences close in time to the testing, but do not necessarily reflect long-range influences on development of concepts of the self. Failure, in school or sports, is likely to have an important and significant immediate consequence. But, as further experience is accumulated, and/or as successes are achieved in the same or similar areas, the influence of the earlier success or failure is likely to be altered. The result is that over time we will assess a balanced view of the self based on a history of interpreting social as well as personal (e.g., pubertal) experiences changes. Measures of self-concept, then, will reflect a balanced view of experiences, with the weighting of positive and negative aspects of the self being based on a cumulative history. The longitudinal studies reported here and elsewhere apparently tap these aspects of views of the self, while the cross-sectional studies apparently reflect the more short-term impact of events more closely associated in time with the measurement of self-concept.

To the degree that the above reasoning is sound and is a valid representation of the manner in which the self is represented on tests of self-concept, it points out the importance of caution in relying on cross-sectional studies for describing developmental change. The issues involved here have been extensively discussed by others (e.g., Schaie, 1965; Baltes, 1968; Baltes & Nesselroade, 1970) and need only be mentioned briefly here. Of major importance is the fact that cross-sectional studies measure subjects of different cohorts. To the degree that cohort differences are confounded with age these studies will not present a veridical picture of reality. That seems, in part, to be the case with studies of adolescent self-concept. The picture of self-concept development that emerges from the cross-sectional and longitudinal studies is very different, in part because of cohort changes. In addition, the longitudinal study is confounded by time of measurement influences. By employing new samples of subjects at each grade level and demonstrating that these subjects performed on the scales in a comparable manner to the retested subjects, the longitudinal component of the present research represents a relatively realistic view of the course of self-concept development (Schaie, 1965).

One basic conclusion from the current research, then, is that adolescence is not a time of dramatic upheaval in the self-concept. Although clinical studies (e.g., see Wolf et al., 1972; A. Freud, 1958) may demonstrate such changes for subjects undergoing intensive analysis the representativeness of the subject sample must be questioned. Our data suggest, and statistics (Rutter, Graham, Chadwick, & Yule, 1976) on percentage of adolescents seeking clinical help bear out, that for most adolescents the self is viewed in a continuous manner over time. As has already been stated, this is a reasonable finding and, perhaps, is to be expected if one considers that the self that emerges from adolescence is going to be basically the same as the self that entered adolescence. Our everyday experiences most likely reflect momentary alterations in the self due to the immediate impact of some event that has little long-term consequence to how adolescents view themselves. Since these are highly salient encounters we remember them and forget the many days during which such changes do not occur. Hence, our everyday experiences and common sense evaluations belie the data on longitudinal changes.

The findings reported here for adolescent self-concept development have several implications for understanding the nature of adolescence. One set of implications deals with issues of "storm and stress" (Hall, 1904) conceptualizations of adolescence. Another set deals with current discussions of the importance and role of cognition in adolescent self-concept development.

Adolescence has traditionally been viewed as a time of "storm and stress", a period of social, emotional, and personal upheaval and change (cf., Dusek, 1977). Erikson (1963) and Anna Freud (1948, 1958) are perhaps important current proponents of this view, which was first proffered to modern-day psychologists by G.S. Hall (1904). As a result of this view adolescence has been stereotyped to such a degree that the concept of storm and stress is often applied as an explanatory concept with regard to adolescent behavior. Examination of data on adolescent development, including that on self-concept presented here, however, indicates that adolescence is not a period of storm and stress or rapid and extensive change (e.g., Coleman, 1978). Rather, transitions in self-concept, relations with peers and parents, sexual relations, moral thinking, and the like are gradual for the large majority of adolescents. As Coleman (1978) points out, the popular conceptualization of adolescence is not well documented in the experiences of most adolescents, although for some the popular storm and stress view may be veridical.

To explain the preponderence of evidence favoring the "empirical" over the "classical" views of adolescence, Coleman (1978) has suggested a "focal" theory of adolescence. The essence of the focal theory is that adolescents face and deal with conflicts, in effect, one at a time. Since conflicts in the areas of peer or parent relations, identity diffusions, heterosexual relationships, cognitive development, and the like peak at different age levels (Coleman, 1974) it is possible for them to be adapted to individually. No assumption is made of an invariant sequence in the emergence of these problem areas. It is assumed that overlap in the various conflict areas may occur, and that for some adolescents the overlap may produce severe conflict. However, for the majority of adolescents, the conflicts will not result in severe changes because (a) they peak at relatively disparate times and (b) they reflect relatively minor alterations from the norm. For example, there is considerable evidence, reviewed by Coleman, George and Holt (1977) and Dusek (1977) indicating that what is commonly called the "generation gap" between parents and their adolescents is a misnomer unless it is applied to relatively mundane instances of everyday interactions between parents and adolescents. The results reported and discussed above are consistent with, if not a direct test of, this focal theory.

The findings reported above also are consistent with, and supportive of, current commentary (e.g., Brim, 1975, 1976; Epstein, 1973; Montemayer & Eisen, 1977) on the importance of considering cognitive functions in the formulation of self-concept. Brim and Epstein have both interpreted the self-concept as a personal theory of the self, formulated according to, and subject to, the same sets of processes and rules as any other theory. In this context, Brim has suggested that theories of the self-concept are "theories of self theory". Theories of the self depend upon what is available in the culture. Brim (1975, 1976) has discussed these issues in depth. Epstein (1973) has made similar observations and, further, has pointed out that a key aspect of the process is knowledge acquisition about the self. Epstein goes on to point out the importance of cognitive functioning in the formulation of theories of the self. Finally, Dickstein (1977) has attempted to directly relate advances in cognitive development to changing conceptions of the self. However, research on the relation between measures of self-concept and measures of cognition is relatively rare.

Guardo and Bohan (1971) tested the concept that the emergence of self-identity paralleled the stages of development postulated by Piaget (1952). Piaget (1968) has contended that views of identity, or self-views, change as cognitive development proceeds to increasingly more sophisticated levels. Children aged 6, 7, 8 and 9 were interviewed about their sense of self-identity and were asked to state their reasons for answering the questions as they did. The results indicated that there were qualitative differences in the sense of self-identity, with older children gibing responses that were more sophisticated developmentally. Younger children tended to give yes or no answers to the questions about why they answered as they did; older children answered in ways indicative of an advanced level of understanding of causality and the permanence of identity.

Similar findings have been reported by Emmerich (1974), Koocher (1974), and Montemayer and Eisen (1977). In the latter study, adolescents were shown to use more categories than children in describing their self-image. And, the categories used by adolescents were qualitatively more complex than those used by children. In contrast to children, adolescents responded in a manner suggesting that they perceive in themselves sets of underlying abilities, motives, and personalities. The adolescent, then, but not the child, is able to infer a set of beliefs and personal styles that are unique.

Data such as those briefly reviewed above have several implications for the study and understanding of adolescent self-concept. First, they begin to explain why identity confusion and conflict may be a more acute problem for younger than older adolescents (cf., Coleman, 1978). It is in early adolescence that cognition changes to include what Piaget (1952) has called formal operational thinking. These abstract thinking abilities allow the adolescent to structure concepts of self in more complex and personal ways than was previously possible. Hence, adolescence, and specifically later adolescence, may be a developmental period in which stability in the self-concept is reached. As a result, little change in self-concept measures should be expected. The longitudinal data of this and other studies are consistent with this view. The age differences in the cross-sectional studies in this and other studies likely reflect the influence of both cognitive growth and cultural factors that relate to how adolescents of different grades or ages rate their self-concepts. It appears that these latter studies do not accurately reflect the growth of self-concept.

Second, the current theorizing suggests that although one may measure concepts of self in children or young adolescents the measures may have little predictive validity. In effect, children's conceptions of self may be better indicators of cognitive growth than of personality development. Although verification must await future research, it may be that, in effect, children do not have a concept of self in the sense that the term is typically used. Instruments such as that used in the present study and other research (e.g., Monge, 1973) may not produce constructually valid assessments for young children.

Finally, the literature reviewed above points to the importance of directly assessing the relation between measures of cognition and measures of self-concept. Research aimed at explicating this relationship will go far in clarifying the nature of adolescent identity formation and development and is necessary for elaborating our understanding of adolescence in general.

Results from Adolescent Interests

Rankings of the 14 topics of interest were obtained in order to assess the similarities in interest hierarchies across grades and between the sexes within a grade. Interest ratings were obtained as a means of estimating the position of a topic among all interests the adolescent had. For example, an adolescent who ranked a topic one or two in terms of importance conceivably might rate that topic very low in interest because the set of topics does not include many or most of those that are of high interest to the adolescent. If this were the case we would see a low correlation between the rankings and ratings. As reported above (Table 26), however, the correlations among the rankings and the ratings for each year of the study tended to be well within the moderate range. Topics that were ranked high in salience were also rated high in interest; topics ranked relatively low in salience were also rated as less interesting.

These findings replicate earlier research (Dusek & Monge, 1974; Dusek, Kermis & Monge, 1979) in which the same instrument and procedures were used to measure adolescent interests. As in the earlier research, then, the age difference data are based on a set of relatively inclusive categories.

The correlations among the salience hierarchies revealed two trends. First, the correlations tended to be somewhat higher for adjacent than nonadjacent grade levels. In general, the correlations were higher along the main diagonal and decreased to the right and in an upward direction in the correlation matrix for each year. Second, the correlations indicated a high degree of consistency in the topic salience hierarchies for males and females within a grade level over each of the three years. Half of the correlations were equal to or greater than .90. These data replicate author's earlier research (Dusek & Monge, 1974; Dusek et al., 1979), which demonstrates the value of the interest inventory used. As a result, it was decided to factor analyze the interest ratings in order to assess grade level and sex differences in adolescent interests.

Factor analyses of the interest ratings for each of the three years revealed a degree of factor instability. Four factors emerged from the analyses of the 1975 and 1977 data, with only three factors resulting from the analysis of the 1976 data. These differences in factor structure indicate the importance of sociocultural factors in the development of adolescent interests (e.g., Freeberg & Rock, 1973; Havighurst, 1972; Kirkland, 1976). The data from the 1975 and 1977 subjects replicate the author's earlier research (Dusek et al., 1979) and lend validity to the utility of the instrument for assessing adolescent interests.

The Interpersonal Relations factor was composed of interests indicating an integration of sexuality with understanding others. Interpersonal Relations, then, has a strong sexuality bias, but it does indicate more than sexuality. Interest in Interpersonal Relations generally increased over grade levels. The Education Factor, on which mean factor scores were higher for the older than the younger adolescents, apparently reflects vocational and career plans as well as concern over current education. The factor we have labeled Concern with the Future may reflect our highly technological culture. It hints of environmental concerns (ecology) and in this sense reflects the adolescent's idealistic orientation toward life (cf., Dusek, 1977). These latter two factors were, in effect, combined in the analysis of the 1976 data, which resulted in only three factors. The fourth factor we have labeled Human Ecology or Drugs. There is a very strong "disease" orientation in the items composing this factor, but it also hints of an interest in drugs. It is interesting to note that the Birth Control and Venereal Disease items loaded with Drugs and not with the other sexuality items. It seems that adolescents separate sexual behavior from several of its potential consequences, viz., disease and unwanted pregnancy. As Elkind (1967a, 1967b, 1968) has pointed out, adolescent egocentrism may account for such unexpected findings. Many adolescents may believe the undesirable aspects of sexuality "can't happen to me."

In general, interest in the items defining Interpersonal Relations were higher for the older than younger subjects. Older adolescents were more highly interested in items defining Education than younger adolescents, as might well be expected. Concern with the future was generally higher among younger than older adolescents. The greatest interest in items defining Human Ecology or Drugs was, in general, among the older adolescents. These data indicate not only that social and cultural factors influence the development of interests but also support the contention (Dusek et al., 1979) that cognitive factors exert an impact on the development of interests. These data are consistent with that of other investigators (cf., Dusek et al., 1979) in pointing out these multifaceted factors in adolescent interest development.

The longitudinal data generally support the cross-sectional findings. The rankings and ratings were highly stable across the four years for students in the longitudinal sample. Correlations among the mean rankings over the three years and among the three sets of mean ratings were all greater than or equal to .90.

The component analysis of the data from the subjects in the longitudinal sample resulted in three varimax factors: Interpersonal Relations, Human Ecology or Drugs, and the above mentioned factor composed of items from the Education and Concern with the Future factors. Analysis of the factor scores revealed a Years effect only for the Human Relations factor. Consistent with cross-sectional findings, the mean factor scores generally declined across the three years of the study. Only for Group 6 (grades 10 to 11 to 12) did the mean factor scores increase across time; for Group 4 (Grades 8 to 9 to 10) the mean scores showed an inverted U function and for all other groups the mean factor scores declined over time. These findings are entirely consistent with the cross-sectional data, showing interest in Interpersonal Relations to be higher among the subjects in the upper grade levels. They are also consistent with the findings in the author's earlier research (Dusek et al., 1979).

The results of this study confirm the earlier (Dusek et al., 1979) suggestion that relatively permanent social role expectations and culturally taught materials are one of the underlying bases of development of interests during the adolescent years. Some factors that affect interest development are reflected in broad cultural and social phenomena which change either relatively slowly or not at all over a relatively long time span. These underlying cultural universals affect adolescent behavior more consistently than such acute sociocultural events as the turbulence of the 60's, the emergence of Woman's Liberation movements, and the like. One such underlying factor may be social role expectations for behaviors of individuals in various stages of development, i.e., time-dependent behaviors. Such stereotypical role expectations help us predict and understand the behavior of other people, and probably relate to the development of those people. Since the adolescent role is a relatively stereotyped social role that has probably changed little in the last 40 years, it is not surprising to find that querying adolescents about their interests reveals relatively small changes in interests over that time.

Other data (cf., Dusek et al., 1979) point to the contribution of broad social and cultural factors as underlying determinants of adolescent interests. Drugs and Ecology were not the salient social problems 20 to 40 years ago that they are now. It may be that as salient cultural issues emerge they become of interest and importance to adolescents and as such issues decline in cultural salience they slowly drop out of the hierarchy of adolescent interests. Data such as these support the contention that one of the key factors in the development of adolescent interests is a cultural and social underpinning. This analysis suggests that long-term cultural stability, perhaps characterized by the general cultural style of life, relates to commonalities in adolescent interests across generations. In all likelihood this relationship is mediated by social role considerations about the nature of adolescent behavior and development. Unfortunately, many previous researchers did not assess age trends in interests, precluding a determination of whether the developmental trends in interests in these areas followed the same course of development then as they do now.

The grade level differences in rankings and ratings are quite similar to those reported by Freeberg and Rock (1973) in their study of adolescent social, academic, recreational and leisure time interests and in the author's (Dusek et al., 1979) earlier research. The data from the current sample support Freeberg and Rocks' suggestion that the ninth-grade is an important transitional period in adolescent experience which produces a degree of discontinuity in activities and interests. Increases in the range of social situations and experiences during the later adolescent years no doubt contribute to shifts in interests. In addition, the psychological effects of the onset of puberty may not be felt as strongly during the initial years of puberty as they might be during the eighth- or ninth-grade years. In short, the ninth-grade seems to be a period in the life course when social and biological factors combine to produce a discontinuity in observable behavior.

We would add to that explanation several notions concerning the development of intellect during the adolescent years. As a number of theorists (Elkind, 1967a, 1967b, 1968; Inhelder & Piaget, 1958; Looft, 1972; Piaget, 1952, 1972; Piaget & Inhelder, 1969) have pointed out, during adolescence the individual enters the period of formal operational thinking and this influences the adolescent's interpretation of social encounters. Flavell (1963, 1977) has addressed this issue with respect to role taking, particularly during the childhood years, and Borke (1971, 1972), Chandler (1973; Chandler & Greenspan, 1972) and Shantz (1975) have reviewed data indicating important shifts in role taking that are tied to cognitive development. In addition, Kohlberg (1969) has noted shifts in moral thinking that develop during mid- to late-adolescence that are also tied to cognitive development and role taking. In all these instances, as well as others which we have not mentioned (see Shantz for a review of the social cognition literature), the underlying factor of importance is that with shifts in cognitive capabilities the social environment becomes reinterpreted with a corresponding new understanding of its nature and function. This shift in understanding allows the individual to come to grips with social development in ways that were no previously possible. It is suggested here that as the adolescent's cognitive competencies increase, there is a shift in interest patterns resulting from the new awareness and interpretation of the environment. A specific example may be found in the current study in the age differences in Understanding Other People. To have this concern requires cognitive skills that are not highly used or perhaps even available to transcend ego-centric thinking (Elkind, 1967a, 1967b, 1968; Looft, 1972) and mentally assume another's role. This type of thinking is inherent in formal operational thinking as described by Piaget (Inhelder & Piaget, 1958; Piaget, 1952; Piaget & Inhelder, 1969).

The observed sex differences in interests follow quite in line with social and sex-role expectations (Broverman, Vogel et al., 1972; Kohlberg & Zigler, 1967; Rosenberg & Sutton-Smith, 1960). The data are entirely consistent with traditional sex role orientations and suggest that they have not radically changed over recent years. Similar data have been reported by Broverman, Vogel, et al. (1972) who noted that little change in views of the female sex role had occurred.

With respect to Sexual Relations and Reproduction and related topics there were some surprising findings. First, as might be expected, interest in dating and going steady seems to be the initial basis for interest in heterosexual interaction during adolescence. Interest in love and marriage is closely related. Interest in dating then drops, presumably because the subjects are quite familiar with dating patterns and interactions, but interest in love and marriage remains relatively high, especially for girls. Interest in sexual relations and reproduction is highest in grade 12, and it is higher for boys than girls. Somewhat surprisingly, however, the interest rankings for birth control, though higher for girls than boys, were relatively low for all subjects. Concern about Venereal Disease remained low at all age levels. Examination of the data for these topics on the 7-point rating scale revealed similar trends. The average interest rating is only moderate for venereal disease and the same trend is observable for birth control. However, the ratings for sexual relations and reproduction are generally higher. In other words, the subjects were more interested in sexual relations and reproduction than in several potential consequences of sexual intercourse. In addition, sex differences along traditional sex-role lines appeared for these topics.

These results for sexual interests in this and in our earlier research (Dusek et al., 1979) were surprising for several reasons. First, there was no sex education program in the school system in which these data were collected. As a result, it is unlikely that these subjects had been exposed to a systematic teaching of information about birth control and venereal disease. Assuming that these subjects were generally no more knowledgable about these topics than the average student of their age the results are discouraging in terms of hopes for lowering the reportedly (Burrows, 1970; Manley, 1969) epidemic adolescent venereal disease and premarital pregnancy rates. Second, the sex differences in the rankings for the topics Sexual Relations and Reproduction, Birth Control, and Love and Marriage reflect cultural standards that were thought to have been changing from earlier generations. Although it may be that the gap between the sexes is narrowing, it is clear that there is still a sex difference reflecting values which are not different from those ascribed to previous generations. Although it was not possible to assess in the present study, future researchers may do well to examine actual knowledge in these areas and relate this knowledge to interest rankings and ratings. One would expect that as knowledge is gained interest in the topic might decline. It should be noted that while the topics relating to sexuality were not of the highest salience, they were also not of the lowest. This may well speak to the issue of instituting sex education courses in schools at an earlier age than traditionally has occurred, viz., high school. Additionally, it is possible that subject may deflate expressions of interest in topics relating to sexuality despite an assurance of confidentiality and anonymity. If this did occur, the importance of sexuality and a concomitant need to be taught about its ramifications may be necessary at the third- or fourth-grade level.

The composite that emerges from the various analyses of adolescents' interests strongly disagrees with the notion that little continuity in interests exists between adolescent cohorts. Historical change, so the popular argument goes, has had so extensive an effect on socialization processes that little transgenerational continuity will be found (Bengston & Cutler, 1976; Dusek & Monge, 1974). What this stance overlooks and the present data support is a view of broad-based continuities across generations in terms of social expectancies and cognitive competencies that emerge in adolescents in our culture. These continuities include biological and sexual maturation, the need for a determination of self-identity, and the emergence of hypothetico-deductive cognition. These underlying commonalities in the experiential base of adolescents fosters transgenerational continuity of interest in such topics as future work, marriage, sexuality and humanism. These represent developmental tasks (Havighurst, 1972) for the adolescent in which societal and personal roles must be defined.

To be sure, discontinuities exist in the interests generated by adolescents. These may represent the episodic nature of historical change, e.g., the impact of transient but salient events such as student activism in the 60's and the sexual revolution. These discontinuities account for the intrusion of such topics as ecology and birth control into the general adolescent interest record.

This explanation emphasizes the processes of cohort differentiation in explicating the continuities and discontinuities found in the adolescent hierarchy of interests. At any one point in historical time, society may be conceptualized as being composed of a continuous flow of successive birth cohorts (Bengston & Cutler, 1976). At any given time society's structure is formed of different cohorts at diverse points in their respective life-cycles. Therefore, the adolescent-aged cohorts are contiguously placed between cohorts representing infancy, childhood, adulthood and the elderly. The adolescents of today, as compared to those of 20 or more years ago, represent a unique intersection between the flow of cohorts and system (or society) stability.

The behavioral orientation of the current adolescent cohorts is therefore the result of: (a) particular birth cohorts, which are at a (b) particular chronological or developmental age, in (c) a uniquely structured society (Bengston & Cutler, 1976). Therefore, even given shared maturational and cognitive structures, one would expect that the interest records of varying adolescent cohorts would reflect the topics of high salience to the events of their particular historical period. This assumption was met in comparing the interest records of this current sample of adolescents with those tested earlier (cf., Dusek et al., 1979).

The roles of cognitive and social factors in the development of the self-concept and interests seem to be related. That is, interests and self-concept both develop as a result of cognitive interpretations and evaluations of social encounters. As cognitive development progresses increasingly more sophisticated and complex self-concepts and interests emerge. It appears, then, that measures of self-concept and interests should be related and that self-concept may in part direct adolescents to develop certain interests. We next turn to a discussion of the data bearing on these issues.

Results Relating Self-Concept to Interests

A major purpose of this research was to assess the relation between self-concept development and the development of interests. As elaborated in the introduction and literature review, this research was viewed as a test of the view that the self-concept has a directive and motivating function (e.g., McCandless, 1967, 1970). By using measures of interest, which have been shown to relate to developmental and sex differences and to personality, it was hoped that a suitably sensitive test would be possible. Moreover, McCandless (1970) clearly suggested that interests reflect development of the self-concept. The present research, then, is a direct test of this relationship. Two analytic techniques, factor analysis and canonical correlation, were employed to assess the relation between self-concept and interests.

When the self-concept data and the interest ratings were entered in a common analysis the results indicated virtually no overlap in the two instruments. In only two instances did an interest item appear with a primary loading on a self-concept factor in the three analyses for the cross-sectional samples. A similar result occurred in the analyses of the data from the longitudinal sample. In the analyses from both the cross-sectional and longitudinal samples the data also indicated little overlap in self-concept and interests when sizeable (≤.30) secondary loadings for all items were considered. These data, then, indicated that self-concept and interests develop independently.

The canonical correlation analyses, however, revealed a quite different picture. Significant relationships between self-concept and interests emerged in the data from the cross-sectional and longitudinal samples. Two significant canonical relationships were stably present in the analyses of the cross-sectional data from each year. In addition, the analyses of the data from the longitudinal sample revealed changes in the relation of self-concept to interests over time. These data indicate that measures of self-concept and interests are related during the adolescent years, in support of McCandless' (1970) suggestion.

One stable canonical relationship was evidenced as the first significant variate in the 1975 and 1977 data sets and the second significant variate in the 1976 data set.

Adolescents who feel they are highly masculine in sex role orientation and who rate themselves as not being very friendly or sociable indicate they have little interest in social relations with others, are not concerned about the future or current views of what the future may hold, and have little interest in technology and education. Although at this stage we can only speculate as to the causes of this relationship between self-concept and interests, the data are consistent with the view that adolescents who are unhappy and do not get along well with their peers withdraw from social relations. These adolescents have a somewhat more extremely masculine sex-role orientation that may clash strongly with currently popular concepts about rigidity of sex roles. This orientation may increase rejecting reactions from peers and result in further social isolation.

The second significant canonical variate that emerged each year indicated that relatively well-adjusted, achieving, friendly and less masculine sex-typed adolescents had little interest in drugs and were interested in the future, and in education and technology. These adolescents portray a picture of active involvement in what is going on around them. Examination of the data suggests these people are "doers" who actively engage their environment and derive rewards from it. The canonical relationship also indicates the opposite set of relationships, viz., that less well-adjusted, more masculine sex-typed, and lower achieving adolescents have a high interest in Drugs and little concern over education or with the future. The picture one gets is of an adolescent who has disengaged from everyday social concerns and who may seek escape in drugs. Of course, this is a stereotypic view of some adolescents today. It is interesting that support for this stereotype emerged from the two instruments employed in this study.

The canonical relationships in the analysis of the data from the longitudinal sample support the above findings. Moreover, the pattern of relationships (see Tables 52, 53, 54 and page 69 and 73) indicates that interests may develop in such a way as to coincide with, and reflect changes in, the self-concept. We are suggesting, here, that the self-concept directs interests into specific channels that are consistent with it. McCandless' (1970) position, then, that self-concept has a causal influence on the development of interests is supported by the canonical analysis.

It appears, from the data and theorizing presented above, that the sequence of events is some variant of the following. As the child grows into adolescence there are changes in both cognitive competence, evaluations of self-attributes, and social encounters. The cognitive changes allow for new interpretations of the self (Piaget, 1968) and of the social world (Flavell, 1977; Shantz, 1975). The emergent and changing cognitive evaluations of the self (cf., Montemayer & Eisen, 1977) reflect evaluations of competencies which, in turn, are reflected in interests. As evaluations of competencies change interests are changed and brought into line with the new views of competence. Since views of competence are part and parcel of the self-concept, self-concept becomes a determinant of interests.

The canonical correlation data reported above are consistent with this viewpoint. From this perspective the self-concept is the mediator of the influence of cognitive and social-interactional influences on the development of interests. Changes in the sefl-concept, then, act to mediate changes in interests. To the degree that this formulation is a reasonable representation, it adds construct validity to the self-concept instrument employed and to the interest scale used. As Wylie (1974) has noted, data on the construct validity of self-concept scales is rare. The canonical correlation analysis resulted in a series of relationships that not only were interpretable but also were meaningful, at least in the context of the scales used. These data suggest that the self-concept and interest scales are measuring meaningful aspects of personality and social development, respectively.

Self-Concept and School Achievement

As was pointed out in the literature review, there are a number of studies (e.g., Piers & Harris, 1964; Bruck & Bodwin, 1963; Brookover, 1964) in which the correlations between self-concept and achievement have been reported to range as high as the .50s. Some have argued that these correlations reflect the impact of school achievement on the self-concept while others have argued the reverse causal sequence (cf., Calsyn & Kenny, 1977). The data from the present study allowed for a test of the relationship between components of self-concept, as opposed to a global measure of self-concept, and various measures of academic achievement and IQ.

The results clearly support previous research showing that self-concept is correlated with school achievement and IQ scores. However, consistent patterns of relations occurred only for the Achievement/Leadership factor. This finding not only provides further construct validity for the self-concept instrument, but is consistent with research (e.g., Brookover, 1964; Brookover, Lepere, et al., 1965; Binder, 1960) indicating stronger correlations for measures of academic self-concept than for global self-concept.

The data also showed a developmental trend. At the elementary school level the magnitude and number of significant correlations tended to increase with increases in grade level. These data support the contention raised in the introduction of a developmental trend. It was not possible to assess whether the less consistent relationships reported in the analysis of the data for the ninth- through twelfth-graders was a continuation of the same developmental processes because of the change in achievement tests used for this grade level. At best, we can only speculate that at the upper grade levels a different set of relationships may emerge because of individual differences in the perceived value of school and in the nature and variety of ways in which achievement and success may be obtained. Hence, the Achievement/Leadership factor may reflect different views of what the defining adjectives mean for different grade levels. If the factor Achievement/Leadership reflects such differences one might well expect a different pattern of relationships reflecting these different views.

It is of considerable interest that the patterns of correlations between the self-concept measures and the IQ scores were very similar to those for the achievement test measures. As with the achievement measures, the IQ tests changed at the ninth grade level. These data lend further support to the view that self-concept measures stressing achievement do relate to intellectual competence, but that other aspects of the self-concept, or other types of measures, do not.

The relationships reported above also suggest that the academic performance of the child has a somewhat narrow influence on the child's developing self-concept. School performance, as assessed with grades or achievement test performance, may have little effect on the child's self-concept outside of components related to achievement. Further research should be aimed at clarifying these findings by assessing social, sex-role, and personality characteristics related to the other components of self-concept.

Social Class and Self-Concept Development

Generally speaking, it has been held that adolescents from poverty backgrounds have poorer or weaker self-concepts than adolescents from the middle- or upper-social-classes (e.g., Collins & Burger, 1969; Hauser, 1971; Landis, Hayman, & Hall, 1971). Some data (e.g., Trowbridge, 1970; Soares & Soares, 1969, 1971, 1972), however, indicate this difference may not be as wide spread or dramatic as it at first appears. Trowbridge, for example, reported that general, social, and academic self-concepts did not differ between middle- and lower-class black and white males and females, although the middle-class groups were more positive on measures of home and parent relationships. Soares and Soares arrived at a similar conclusion in their extensive studies of advantaged and disadvantaged children and adolescents. They report only few differences in self-concept.

In the present study it was possible to assess the structure of the self-concept for adolescents who were tested each year. The pertinent data (pages 73-81) came from factor analyses of the self-concept scales for groups of lower- and middle-class adolescents tested each year of the study.[4] Although the results of the analyses for each year's data indicated some minor differences in factor structure, the major conclusion must be that the similarities in structure far outweigh the differences. As may be seen in Table 57, coefficients of congruence reflect this factor structure similarity. And, within-social-class coefficients of congruence computed across the three years of data also indicate a high level of similarity in factor structure.

This set of findings should not be surprising. As we outlined above, the self-concept is based in large part on cognitive evaluations of levels of competence. These levels vary as a function of widely ranging experiences, many of which cut across social class lines. As a result, there is little a priori rationale to expect social class differences in the structure of the self-concept. These data extend earlier research (Trowbridge, 1972; Soares & Soares, 1969, 1971, 1972) and caution against sweeping generalizations of differences in self-concept structure as a function of social class.

Implications for Future Research

In the discussion section above we speculated about the role of both cognitive and environmental factors on the adolescent's self-concept. After briefly explicating this view we shall draw on it and on the data presented above to derive several implications of this research project for future research endeavors.

The data from this and other research, as well as theorizing of others, clearly implicated cognitive functioning as one of the primary determinants of self-concept. Cognitive development may contribute to self-concept formation and change in several ways. For example, cognitive development provides the individual with a basic set of competencies for understanding knowledge. As cognition develops these skills change and allow new kinds of knowledge to be gained and old knowledge to be understood in new and previously impossible ways. In addition, the individual learn to interpret and reinterpret environmental, personal, and physical experiences in terms of the cognitive competence and knowledge available. It is these evaluations, when directed toward one's own experiences in the personal and social world, that come to be interpreted as the "self". As Brim (1975, 1976), Epstein (1973) and others have noted, self-concept may be viewed as a theory of the self. From this theory we make predictions about how we can or should behave in a particular circumstance. We then evaluate our performance, which leads to a restructuring of our theory of the self. As cognitive functioning progresses we come to formulate increasingly more complex and abstract theories of the self (Dickstein, 1977). Hence, the theory of the self will change with development, although we would not expect dramatic upheavals or rapid, pervasive changes. Rather, change would be expected to occur slowly because (a) cognitive changes occur in a continuous, non-abrupt manner and (b) there is continuity of the self over time. In sum, explicating the role of cognitive development in the emergence and development of the self-concept is critical to understanding the self-concept because cognitive processes underlie theories of the self.

At present, only little research has been conducted on the relation between measures of self-concept and cognitive development. Koocher (1974) conducted a study with children between the ages of 6 and 15 years. Two findings are of primary interest. First, with increases in cognitive functioning from preoperational to formal operational development there was increasing awareness of a separation of one's own self-concept from the self-concept of others. Second, with increases in cognitive level there was an increasingly positive ideal self-concept, with the variability of the ratings decreasing. With increases in level of cognitive development there was an increase in the distance between one's self-concept and ideal self-concept and there was increasing agreement on what the ideal self-concept should be. As Koocher points out, these findings are consistent with the view that cognitive operations underlie views of the self. We would add that the data are also consistent with the conceptualization of the self-concept as a theory of the self. Further research on the types of relationships discussed here are clearly called for in order to better delineate the relations between personality development and cognitive functioning. These data, however, lend credence to the view being expressed.

The second set of major factors responsible for self-concept development may be grouped for convenience under the heading of environmental encounters, including such aspects as school, peer relations, role taking, interactions with parents, the reactions of others toward the individual, and a wide ranging set of other environmental influences. These encounters are important for a number of reasons, several of which are central to our interpretation of how the self-concept develops. First, these encounters provide the basis on which cognitive competencies and understanding of knowledge can be tested. In other words, our cognitive abilities are extended to deal with our everyday interactions in the environment, which fosters further cognitive growth. As we evaluate our environmental interactions we confirm or must alter some component of our self-theory, depending on the evaluation of performance. Some encounters will have more long term effects on our emerging self-concept. For example, continual interaction with learning situations in school form a significant basis for our view of our "achieving self". The data reviewed above demonstrate positive correlations between Achievement/Leadership and measures of school achievement and IQ. Some encounters will have a momentary effect on our self-concept but will not exert such an influence as to produce permanent change in it. For example, a good student who fails a test is likely to momentarily derogate the self, but that is likely to pass. In a similar way, a poor student who gets an A on a test is likely to feel a momentary increase in the self as an achiever, but is not likely to permanently radically alter the view of the "achieving self". It is a history of environmental encounters that are cognitively evaluated that leads to some degree of permanence in self-views. A single test grade is unlikely to result in a long-term alteration of the srlf-concept because of the history of testing performance upon which that view is based. Similar comments may be made regarding the other environmental encounters mentioned above. Self-concept views, then, are partially a result of cognitively evaluating our interactions with our environments. The variety of interactions available contributes to individual differences in self-concepts. The commonality of experiences contributes to continuities, as does the basic underlying cognitive developmental sequence.

Environmental interactions can affect self-concept in another important way as well. These interactions provide opportunities for role playing various components of the self. Through role playing the adolescent is able to test the suitability of various roles and discover which "fit" better with the self (cf., Dusek, 1977). By evaluating the fit of various roles the adolescent can find those that are most well suited to his/her competence. In turn, this will lead to a type of consistency in the self over time.

This perspective receives some support from the data collected in this project. As we noted in the results, the longitudinal data demonstrated consistency in the self-concept measures over a three year period. The cross-sectional comparisons, which showed grade level differences, did not replicate each other. This may be due to differences in the experiences of subjects at different grade levels when compared at one point in time, to the sensitivity of the semantic differential items to factors that momentarily influence the ratings of the self, or to the different interpretations children of different sognitive abilities place on the adjectival pairs (cf., Montameyer & Eisen, 1977, for a discussion of differences in self-descriptors as a function of age). Of course, interactions among these and other factors may account for these differences. Had a different instrument been imployed it is quite possible that a different set of findings would have emerged.

The measures of self-concept did, however, relate in meaningful ways to measures of interests, and to achievement test and IQ scores. The semantic differential format, then, is useful for assessing long-term components of the self-concept, even though it may be sensitive to momentary fluctuations.

The theoretical conceptualization offered here, and above, and the data from the present research suggest the value of further research on the adolescent's self-concept. This research should be aimed at better delineating the nature of the contribution of cognitive processes to self-evaluation. For example, research on the types of self-concept instruments that are best used for subjects differing in cognitive level would help clarify developmental relationships by specifying which tests are likely to produce unreliable results. Studies using a multi-trait, multi-method format will help us better understand the relationships between various tests of self-concept. The wide variety of available instruments makes this a necessary type of research, a modest start of which may be found in Winne, Marx, and Taylor (1977). Very short term longitudinal studies should be done to measure the impact of various environmental encounters on the self and estimate the likelihood that they will exert long-term influences. Finally, research linking self-concept development to other aspects of development that are mediated by cognitive functioning, such as moral development, should be conducted. These studies will help bridge the gap between cognitive, social, and personality development and will lead to an understanding of the human organisms interrelated complexity that has not heretofore been achieved.

Footnotes

1. Monge (1973) used the same procedure and set of scales in his study of adolescent self-concept. He kindly provided the complete set of factor loadings from his overall analysis (Table 6, page 388 of Monge 1973) for comparison with the data collected for this report. Coefficients of congruence for like-factors from Monge's study and the 1975 data ranged from .90 to .97, indicating a high degree of similarity in factor structures for the two data sets. Coefficients of congruence between the factors from the 1976 and 1977 data sets were equally high when each was compared to Monge's data. Discrepancies in age and sex differences in mean factor scores, then, are not due to differences in the factors resulting from analyses of the two data sets.

2. A factor analysis extracting four factors resulted in a fourth factor defined by an eigenroot of .98 but on which the only major loading was Drugs. Since one item is not sufficient to define a factor the analysis resulting in three factors is presented.

3. Extracting four factors from the data for the retested subjects did not result in a factor structure more similar to those reported for the individual year analyses.

4. For the 1975 data level of social class was entered as a variable along with the 21 responses to the self-concept items in a factor analysis to determine whether social class level would load on any specific factor. This analysis was done for the total sample as well as separately for the male and female samples. In all cases the social class variable loaded by itself as a one item factor. Therefore, it was decided to assess the factor structure of the self-concept for groups of subjects divided according to social-class membership.

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